

**BUFFALO POUND WATER ADMINISTRATION BOARD**

2012 annual report

## **BUFFALO POUND WATER ADMINISTRATION BOARD**



### **CONTACT INFORMATION**

The Buffalo Pound Water Treatment Plant is located approximately thirty kilometres northeast of the City of Moose Jaw, Saskatchewan, on Highway No. 301, seventeen kilometres north of the intersection with Highway No. 1.

The plant's mailing address is P.O. Box 1790, Regina, Saskatchewan, S4P 3C8.  
The telephone number is 306-694-1377, fax 306-694-6050.

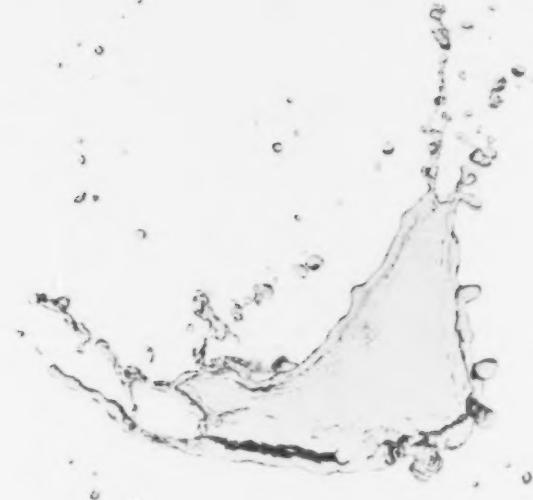
Plant management staff may be reached by email at the following addresses:

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Dan Conrad, Assistant Superintendent / Chemist: [dconrad@regina.ca](mailto:dconrad@regina.ca)  
Tim Sedgewick, Plant Engineer: [tsedgewick@regina.ca](mailto:tsedgewick@regina.ca)  
Gene Berezowski, Plant Foreman, [gberezowski@sasktel.net](mailto:gberezowski@sasktel.net).

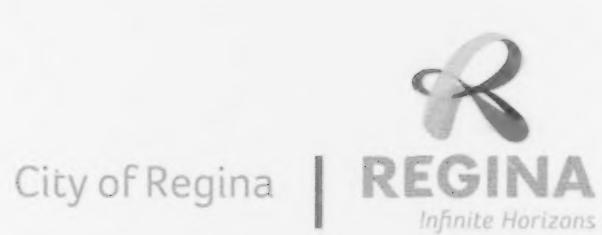
The City of Regina maintains a web site containing information about the Buffalo Pound Water Treatment Plant. This may be accessed by going to <http://www.regina.ca/residents/water-sewer/water-publications/>

Information about the Buffalo Pound Water Treatment Plant is also available from the City of Moose Jaw's website <http://www.moosejaw.ca/?service=water-management>

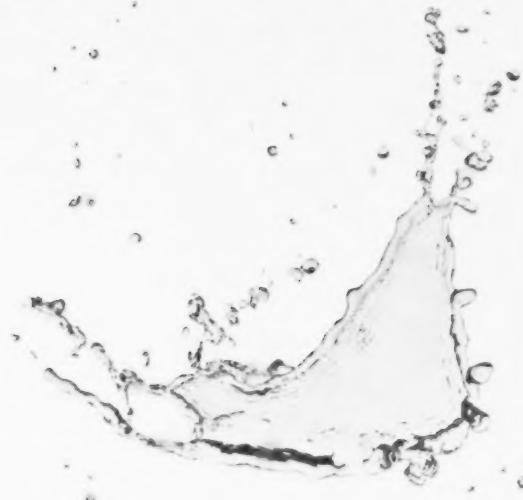
BUFFALO POUND WATER ADMINISTRATION BOARD



## 2012 annual report



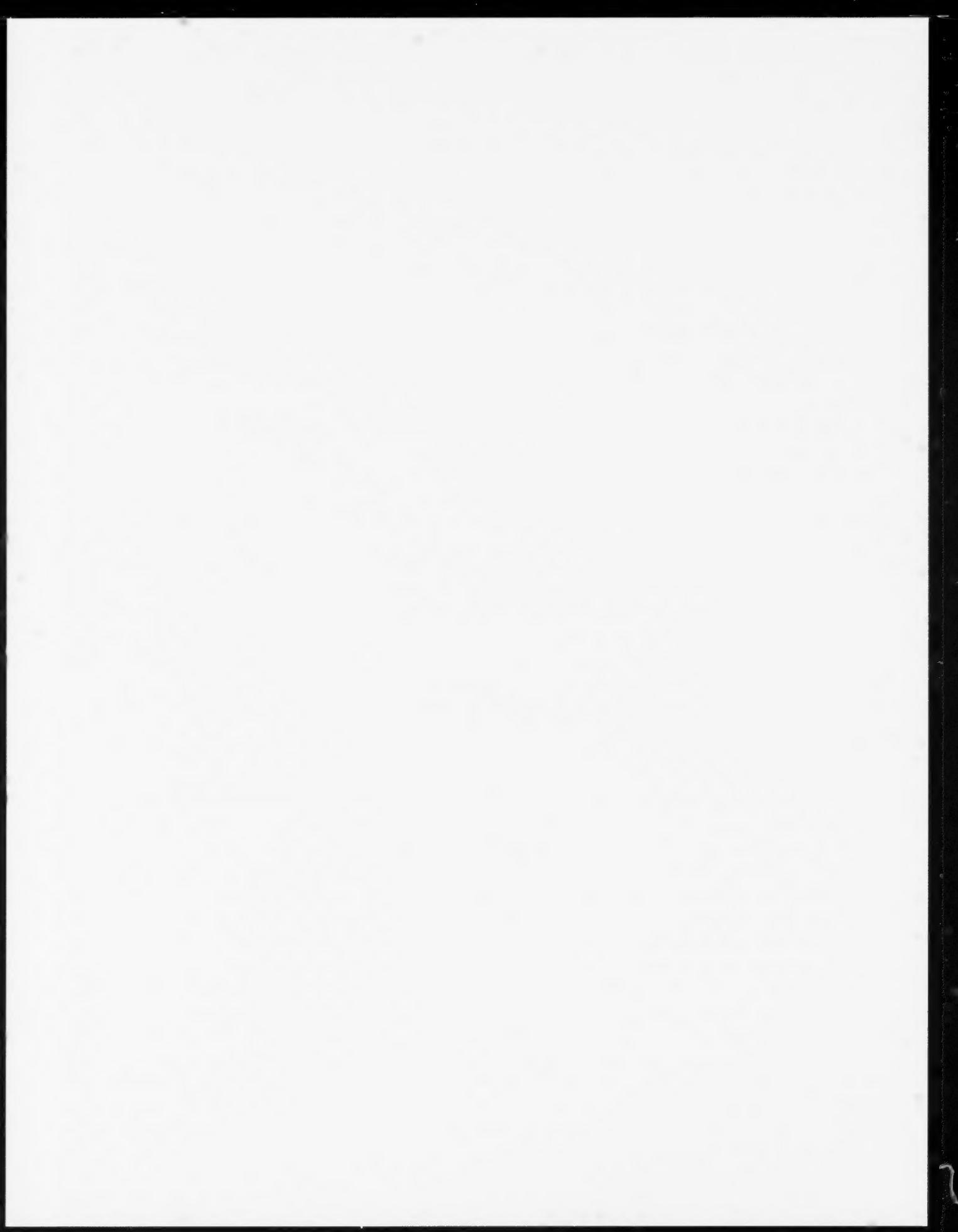
**BUFFALO POUND WATER ADMINISTRATION BOARD**



**2012 annual report**

**BUFFALO POUND WATER TREATMENT PLANT  
ANNUAL REPORT - 2012**

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**BUFFALO POUND WATER ADMINISTRATION BOARD**



**BOARD CHAIRPERSON'S LETTER**

On behalf of the Board of the Buffalo Pound Water Treatment Plant I am pleased to present the 2012 Annual Report of the Buffalo Pound Water Administration Board.

The Buffalo Pound Water Treatment Plant continued to provide abundant quantities of water to our customers that met or exceeded regulatory requirements and our own standards. That our outcomes were achieved effectively and efficiently, and with a high level of system reliability is a testament to the dedication, expertise and creativity of our staff.

While 2012 was a successful year in terms of meeting objectives there were many challenges. Perhaps the greatest was ongoing poor source water quality from Buffalo Pound Lake due to 2011 flooding. This continued to challenge the ability of the plant to meet aesthetic objectives (taste and odour). However, the safety and availability of water met or exceed requirements and objectives throughout the year.

Plant staff participated in the capital Upgrade Project as members of the project steering committee, and in the on-site process pilot plant. As well, plant staff participated in a vulnerability assessment with the City of Regina to identify technological and system risks to water quality and availability to our customers.

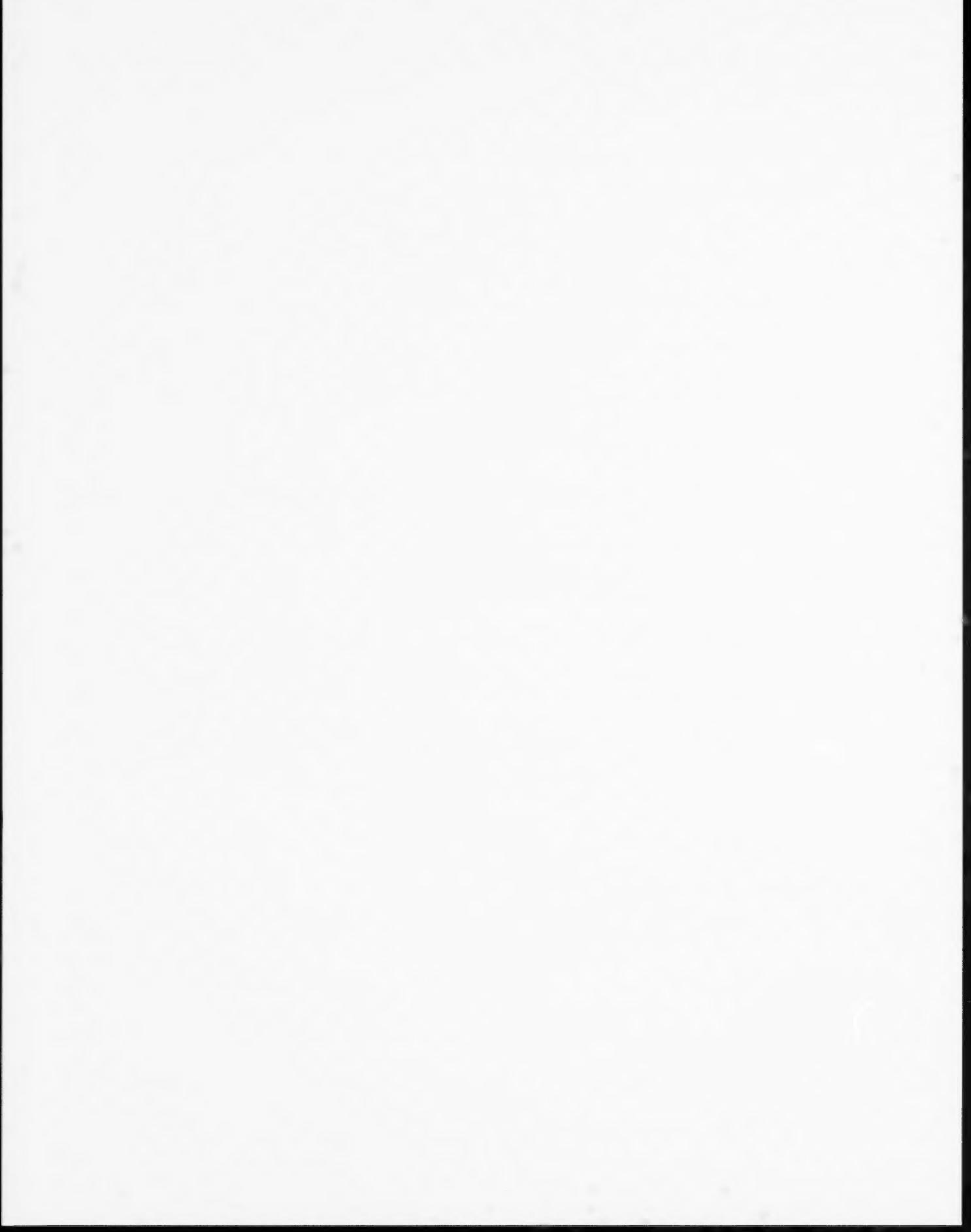
The Board, through plant staff, participated as a stakeholder in a number of government and industry initiatives related to water policy and use. It is important for us to understand changes in our environment and be active in speaking to issues that impact our business.

In late 2012 the Board initiated a governance review to improve effectiveness of the current board structure, identify risks to the plant, and consider opportunities for governance improvement. In 2012 the Board representative from Moose Jaw changed with Mr. Mokles Rahman leaving the Board and Mr. Mahabub Zaman joining the Board. The Board thanks Mr. Rahman for his participation and contributions.

The Board is grateful for the continued dedication of plant management and staff in efficiently operating and maintaining the treated water supply for Moose Jaw and Regina. Several times every day when customers turn on the tap they give a quiet vote of appreciation for the work done to ensure that they are receiving safe, high quality water.

A handwritten signature in black ink, appearing to read "D. Bellows".

Derrick Bellows, P.Eng., FEC, ICD.D  
*Chairperson*  
*Buffalo Pound Water Administration Board*



## **BUFFALO POUND WATER ADMINISTRATION BOARD**

### **BUFFALO POUND WATER ADMINISTRATION BOARD 2012 ANNUAL REPORT**

#### **INTRODUCTION**

This report summarizes the activities and major events at the Buffalo Pound Water Treatment Plant during 2012. The report outlines the Mission and Goals, achievements and areas of concern. It is intended as an information source for city administration personnel, elected officials and the general public. This report also contains the Drinking Water Quality and Compliance Report required by provincial regulations.

#### **BUFFALO POUND WATER ADMINISTRATION BOARD**

The Buffalo Pound Water Administration Board was created under the terms of agreements between the City of Regina and the City of Moose Jaw. In accordance with the agreements the Board is composed of two senior members of the City of Regina administration and one senior member of the City of Moose Jaw administration.

#### **BOARD MEMBERS**

Derrick Bellows, P.Eng., FEC, ICD.D

Board Chairperson

Director, Special Projects Secretariat

City Operations Division

City of Regina

Mr. Mahabub Zaman, M.Eng., P.Eng.

Manager of Engineering Services

City of Moose Jaw

Mr. Chuck McDonald, B.A., B.B.Admin, CMA

Director Finance

City of Regina

#### **WATER TREATMENT PLANT MANAGEMENT**

Mr. B. Boots, P.Eng., FEC                      Plant Superintendent

Mr. D. Conrad, P.Chem.                      Assistant Superintendent / Plant Chemist

Mr. T. Sedgewick, P.Eng.                      Plant Engineer

Mr. E. Berezowski                              Plant Foreman

**BUFFALO POUND WATER ADMINISTRATION BOARD**

**MANAGEMENT REPRESENTATION LETTER**

The Buffalo Pound Water Treatment Plant is the source of drinking water for the cities of Regina and Moose Jaw, as well as other smaller nearby communities. It is a large facility that has been in operation 58 years. The last three major capital improvements at the plant were the second raw water intake in 2001, twinning the raw water supply pipeline in 1999 and the expansion in 1988. The Buffalo Pound Water Treatment Plant Upgrade Project currently underway is intended to address the facility's capital needs to ensure safe drinking water.

In 2012 major efforts were made to evaluate various process upgrades. A pilot plant was built to test the possible implementation of biological processes to address taste and odour concerns. This pilot was successful, illustrating that this process could achieve good results if implemented. It is important to learn what may work and it is also important to learn what treatment processes don't work. Such was the case when a pilot study of using Advanced Oxidation Processes (AOP) to address taste and odour revealed AOP would not provide much benefit even though that process has been successful in other locations in North America.

The pilot testing phase of the Upgrade Project has now been completed. Design and construction of the selected processes will provide continued assurance in the ability of the Buffalo Pound Water Treatment Plant to supply safe, high quality water.

The Buffalo Pound Water Administration Board is a major stakeholder representing the two cities in consultations led by the province to develop a new operating plan for Lake Diefenbaker as well as the creation of the province's 25 Year Water Security Plan. The Board is also keenly involved in the discussions to improve the Upper Qu'Appelle Conveyance involving the provincial Water Security Agency and the now defunct South Central Enterprise Region.

I extend my sincere appreciation to all plant staff for their dedication in meeting and achieving the Buffalo Pound Water Administration Board's Mission and Goals.



Ben Boots, P.Eng., FEC  
Plant Superintendent

## MISSION AND GOALS

### MISSION

- \* To provide for the cities of Regina and Moose Jaw a reliable and affordable supply of safe, high-quality drinking water which meets the needs and expectations of consumers.

### GOALS

- \* Treated water that meets the quality expectations of the citizens of Moose Jaw and Regina, and meets or exceeds all government regulated parameters.
- \* Operational practices and controls that ensure a continuous and safely-treated supply of water within an environmentally-responsible and cost-efficient operation.
- \* Judicious monitoring of the treated water from the plant to the end of the cities' distribution systems. Appropriate monitoring of the water in Buffalo Pound Lake, the Upper Qu'Appelle River and Lake Diefenbaker to identify long-term trends and areas of concern to protect the water supply.
- \* Water quality research to identify possible chemical and microbiological contaminants as well as to test and implement the best available treatment technologies, thus ensuring that the water treatment plant can meet current and future expectations for regulated parameters.

## RESOURCES

### WATER SOURCE

Water for Regina and Moose Jaw is taken from Buffalo Pound Lake, a shallow reservoir in the Qu'Appelle Valley. The lake is 29 km long, 1 km wide but has an average depth of only 3 metres. The surface area of Buffalo Pound Lake is 2900 hectares inferring it has a capacity of 90 million cubic metres at the "full supply level" of 509.3 metres above sea level. Water levels in Buffalo Pound Lake are controlled by the Saskatchewan Watershed Authority and maintained by the release of water from the Qu'Appelle Dam on Lake Diefenbaker. Mean annual water releases of 5 to 1 cubic metres per second are typical. Thus the average residence time of water in the lake varies from six to thirty months. Very little water enters Buffalo Pound Lake from rain or spring runoff except in abnormally wet years. The principal source of the water is rain and snow-melt in the mountains of Alberta, collected by various tributaries draining to the South Saskatchewan River and stored in Lake Diefenbaker. As such, the water is potentially affected by discharges from point sources (upstream cities) and non-point sources (agricultural and recreational).

Buffalo Pound Lake is generally free of industrial pollution but is naturally rich in nutrients (phosphate, nitrogen and dissolved organic carbon) which encourage the growth of phytoplankton (typically diatoms in the winter and green algae or cyanobacteria in the summer). Weed growth can also be extensive. Algae and weeds pose many treatment challenges such as high chemical demands and undesirable tastes or odours. The lake and watershed appear to also be impacted by ground waters infusing minerals.

### PLANT TREATMENT

Raw water from Buffalo Pound Lake passes through a series of treatment stages designed to remove impurities such as algae, bacteria, clay particles and dissolved organic materials. The objective of this treatment is to produce water that is clear, colourless, odour-free, aesthetically pleasing and safe to drink.

The treatment process consists of six stages: chlorination, cascade de-gasification, coagulation flocculation, clarification, filtration and carbon adsorption.

Lake water enters a pumping station located on the south shore of Buffalo Pound Lake through two submerged intakes. Raw water is chlorinated and then pumped to the treatment plant via two pipelines connecting the pumping station to the main treatment plant. The pipelines are 1.05 and 1.35 metres in diameter, extend a distance of 3000 metres and rise 82 metres. After reaching the plant, water is initially divided into two streams, each of which has cascade de-gasification, coagulation/flocculation and clarification. The streams are then recombined for the final stages of treatment, including filtration, carbon adsorption and further chlorination.

Cascade operation is normally used during periods of excessive dissolved gas levels in the raw lake water. Excessive dissolved gases are most commonly produced by photosynthetic bacteria and algae. During cascade de-gasification, the water falls over a series of steps which releases excess dissolved gasses and prevents the formation of gas bubbles in later treatment processes. Clarification and filtration processes could be impeded by gas bubbles that attach to particles of floc, causing them to float, rather than sink, and by causing air binding in the filters.

If conditions warrant, powdered activated carbon (PAC) is added to reduce taste and odour. The use of powdered activated carbon while relatively infrequent is occasionally necessary when granular activated carbon contactors are off line or to temporarily reduce the odour loading when the contactors are on-line.

Coagulation and flocculation are the next steps in treatment. Aluminium sulphate (alum) is vigorously mixed with the water. In the process of coagulation, the alum neutralizes surface charges on particulate matter contained in the water and forms a fluffy precipitate (floc) that entraps suspended algae and clay particles. The water is then stirred slowly in flocculation tanks to allow floc particles to become larger and denser prior to their removal.

The floc-bearing water then flows through clarifiers, where most (more than 95%) of the floc with its entrapped impurities is allowed to settle by gravity to the bottom while clear water is constantly removed from the top. Settled floc is removed from the clarifiers as sludge and pumped to holding lagoons where it is further separated into clear water (returned to the lake) and solid sludge (removed for disposal).

Any floc that was not removed by clarification is separated in the filtration stage. Water is passed through mixed-media filters consisting of a top layer of coarse anthracite followed by successive layers of fine silica sand, and even finer garnet sand. Any remaining particulate matter or floc is trapped by the filters. Filters are cleaned by backwashing with clean water. The filtration step completes the removal of particulate impurities. The removal of dissolved organic impurities, which are responsible for taste and odour, is accomplished next in the carbon adsorption stage of treatment. Large rectangular tanks (contactors) contain granular activated carbon (GAC) to a depth of 3 metres. Water is lifted by Archimedes screw pumps from the bottom of the filters and taken to the top of the contactors where it is allowed to flow by gravity down through the GAC. GAC contains many microscopic pores which adsorb dissolved chemical impurities. Water is in contact with the GAC for 15 to 30 minutes, depending on flow rates, and emerges freed of the dissolved organic materials which cause objectionable taste and odour. The GAC filtration process at Buffalo Pound was designed for taste and odour removal and is used during periods of poor taste and odour in the raw water; the normal period of operation is from May until December.

All stages of water treatment are now essentially complete. Prior to delivery by pipeline to the consumers, chlorine levels are adjusted, if necessary, to provide adequate disinfection and to counteract any possible contamination encountered during its travel to the cities' reservoir and distribution systems. Water delivered to the City of Moose Jaw is also fluoridated prior to pumping.

The carbon used in the contactors retains its effectiveness for taste and odour improvement up to six months, after which time it must be regenerated or replaced. GAC is a relatively expensive treatment component and it has been found to be cost effective as well as environmentally responsible to regenerate the used GAC rather than to discard it and purchase new. Regeneration is accomplished by heating the spent GAC to 850°C in an oxygen-free atmosphere contained in a fluidized bed gas-fired furnace. Spent GAC is transferred by pipeline as a slurry from the contactors to the furnace, regenerated to process specifications, and returned to the contactors for reuse. Carbon regeneration is usually performed at Buffalo Pound from mid-October to mid-April.

#### ENVIRONMENTAL PROTECTION AND CONSERVATION

The Buffalo Pound Water Treatment Plant, like any large industrial facility, has the potential to affect the environment. The plant has facilities in place to handle all process wastes including alum sludge, off gases from the carbon regeneration facility, laboratory wastes, various solid wastes generated by plant operations, and sewage. The plant uses a considerable quantity of electrical energy in its operation; conservation efforts give returns in the form of reduced demands on the environment and lower operating costs.

A series of sludge lagoons is used in the treatment of the alum sludge waste stream. This form of sludge management can be very effective in ensuring that the sludge is retained. Sludge is exposed to a natural freeze-thaw cycle that dewateres it to produce a nearly dry granular material which is transported to a landfill site. Buffalo Pound is one of the few water treatment plants in Canada with the ability to manage waste sludge in this manner.

Because the plant's lagoons were identified as being undersized in the 2005 and 2010 Water Works System Assessments the Upgrade Project includes plans to improve residuals management.

The natural gas-fired furnace in the carbon regeneration facility produces off gases which are thoroughly scrubbed before release to the atmosphere.

Waste disposal agencies are contracted to handle laboratory wastes and solid wastes generated by the plant. As it becomes necessary, firms specializing in hazardous waste disposal are contracted to dispose of chemical wastes.

Sewage generated by the plant is pumped to treatment and evaporation lagoons located on plant property. The primary lagoon has a geotextile fabric and bentonitic clay liner to prevent seepage.

Efforts are continually made to utilize electrical energy in the most efficient fashion possible. The biggest consumers of power are the large pumps located at the lake pumping station and the units that pump water to the cities.

**WATER QUALITY MONITORING**

A well-equipped accredited laboratory is located on site and used to monitor the quality of raw and treated water as well as water quality at several intermediate steps in the treatment process. Major process control parameters (turbidity, pH, chlorine residual, particle counts, dissolved oxygen and temperature) are monitored continuously by instrumentation communicating with the plant process computer system. Analyses are performed for most regulated parameters on a daily to monthly schedule; for other parameters (most trace-level organics and metals) samples are sent to commercial laboratories. Analytical results are compared to Canadian Federal guidelines and to Saskatchewan Ministry of Environment (MOE) objectives. All criteria for safe drinking water were satisfied by the Buffalo Pound Water Treatment Plant in 2012.

Analyses for a wide variety of physical, chemical, and microbiological parameters are performed in the Buffalo Pound Laboratory. Some 65 different constituents are routinely determined and approximately 25,000 tests are done yearly. The 2012 results are summarized in Appendix 1, together with results for metals and organics obtained from commercial laboratories.

The quality of the regenerated granular activated carbon is monitored by plant staff for a variety of physical and chemical parameters.

A vigorous in-house quality control program is maintained to ensure data generated by the Buffalo Pound Water Treatment Plant Laboratory is valid. The laboratory is accredited by the Canadian Association for Laboratory Accreditation (CALA) for 31 different chemical and bacteriological parameters. The CALA external audit was conducted during the week of November 26. These audits occur every two years and are required for the laboratory to maintain its ISO accreditation. The audit, and the preparation for the audit require a large amount of staff time and resources. Items of "non-conformance" were generally minor in nature and addressed within the given time frames.

**PLANT OPERATIONS AND MAINTENANCE****WATER PRODUCTION**

Water Production and sales (in megaliters) were as shown in Table 1. (See also related Graphs 1 and 2.) Total sales to the cities in 2012 were 29,189 ML to Regina and 5,540 ML to Moose Jaw. Sales to Regina increased 6.2% from 2011, and sales to Moose Jaw declined 9.9%.

The amount of water treated in September 2012 was the largest "September" on record, the amount for October 2012 was only 6 megaliters lower than the largest previous "October" and the amounts treated in November and December 2012 were the largest "November" and "December" on record. Sales to the SaskWater Corporation in 2012 increased by 20.9%, to 232.8 ML. Sales to SaskWater represent less than one percent of the plant's production. It is worthwhile to note that the total amount of water sold to the SaskWater Corporation in all of 2012 is equivalent to 30 hours of combined sales to Regina and Moose Jaw in July.

Graph 3 shows annual water production by year since the plant began operation in 1955.

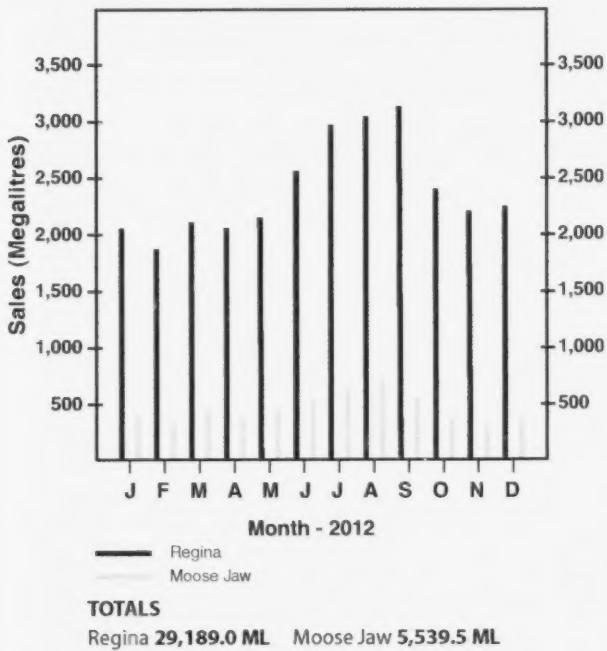
**Table 1: 2012 WATER SALES (MEGALITRES)**  
**BUFFALO POUND WATER TREATMENT PLANT**

MONTH	REGINA	MOOSE JAW	SASK WATER CORP.
January	2,099.3	404.9	13.4
February	1,980.8	377.1	13.2
March	2,118.2	419.7	17.7
April	2,068.4	398.4	19.0
May	2,310.5	484.3	23.5
June	2,568.3	515.7	26.9
July	2,902.5	615.7	29.0
August	3,033.7	625.5	23.3
September	3,170.0	521.9	22.1
October	2,437.3	402.3	16.2
November	2,237.5	379.4	12.8
December	2,262.5	394.6	15.8
<b>Totals</b>	<b>29,189.0</b>	<b>5,539.5</b>	<b>232.8</b>

BUFFALO POUND WATER ADMINISTRATION BOARD

*Graph 1*

**BUFFALO POUND WATER TREATMENT PLANT**  
MONTHLY SALES TO REGINA & MOOSE JAW - 2012



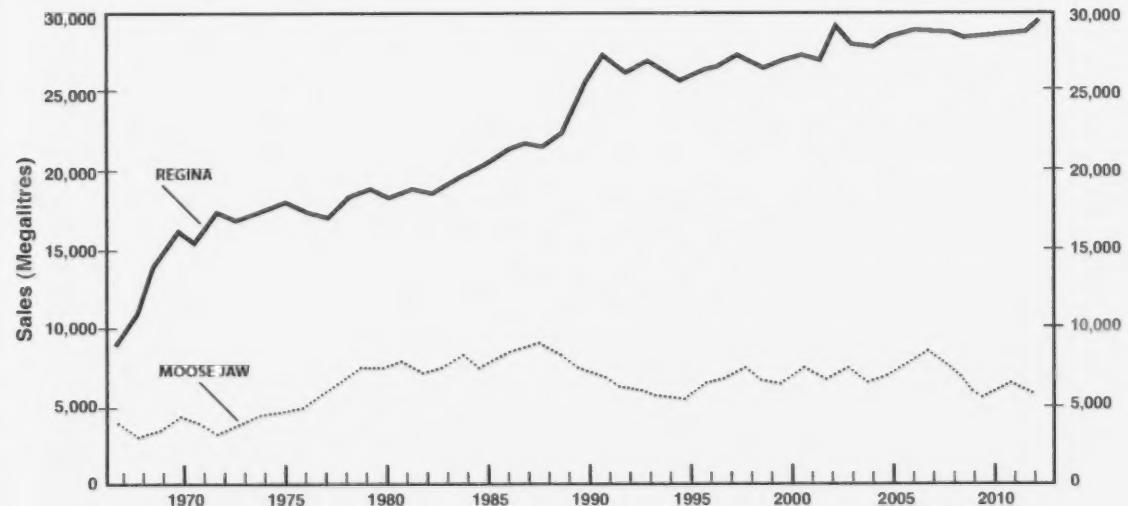
*Graph 3*

**BUFFALO POUND WATER TREATMENT PLANT**  
ANNUAL RAW WATER WITHDRAWN  
1955 - 2012



*Graph 2*

**BUFFALO POUND WATER TREATMENT PLANT**  
ANNUAL SALES TO REGINA & MOOSE JAW  
1967 - 2012



## PLANT OPERATIONS

The processes employed at the Buffalo Pound Water Treatment Plant are modified during the year as determined by the water quality in Buffalo Pound Lake.

Ice cleared the lake on April 4, 14 days earlier than the average. Chemical dosages were at first normal but then increased dramatically in the late summer of 2012. Powdered activated carbon had been employed on a continuous basis since the GAC's were turned off in January, 2012 to address odours in the lake. The granular activated contactors were put into operation on May 7 and because of the poor lake water quality in the late summer, fall and winter were still in service at year end.

In the fall of 2012 the lake froze over November 9.

## CARBON REGENERATION FACILITY

The carbon is regenerated in the winter so that it can be used to remove taste and odour from the water in the following summer. The 2011 / 2012 regeneration system was from October 17, 2011 to April 5, 2012. The 2012 / 2013 regeneration season commenced October 17.

## MAINTENANCE AND CAPITAL PROJECTS

Effective maintenance plays a key role in keeping the water treatment plant running efficiently producing high quality water. All vessels are drained, cleaned and inspected at least annually. All critical plant equipment is inspected, tested and maintained at least annually to help ensure satisfactory operation during peak flow demands. All water quality monitoring instruments are checked or calibrated in accordance with our Quality Assurance / Quality Control policy. The results from major on-line instruments are compared to laboratory instruments.

Several projects were completed with funds from the Capital Replacement Reserve for a total cost of \$269,307. Further progress was made on the project updating the process and instrumentation drawings. The screw pumps were sandblasted and recoated with a high-solids epoxy. The plant participated in a vulnerability assessment of the water supply to Regina. A new graphite furnace and atomic absorption spectrophotometer was acquired for the laboratory. A replacement truck was also acquired.

In addition to the projects funded by the Capital Replacement Reserve other projects were completed.

The extended power outage of July 29, 2011 caused damage to the 4,160 volt switchgear in the Granular Activated Carbon Contactor area. Sufficient repairs were done immediately after that event to make the switchgear operational. Additional cleaning and repairs were conducted in January and March, 2012 to increase the reliability of this switchgear.

A substantial amount of repair work was required at the carbon regeneration plant. Significant repairs / patches were required to the furnace exterior plate, especially on the south side of the regeneration zone. Replacement of the refractory in the lower part of the dryer was completed by the firm that did the rebuild work in 2004. A new water softener on the boiler feed water system was installed. A new recycle blower and a new exhaust blower were installed during the regeneration plant summer shutdown period.

A new 24 inch plastic pipe was installed inside a failed 36 inch culvert on the Lake Pump Station access road. This culvert is under the two raw water supply pipelines, the 72 KV electrical supply power line and a natural gas line. The annulus between the two pipes was grouted filling any potential cavities beneath the raw water pipelines.

A new office (non-production) server was installed; this unit required installation of new higher amperage circuitry. The east alum storage tank liner was removed for replacement in early 2013.

## UPGRADE PROJECT

The Cities have committed funds to upgrade the Buffalo Pound Water Treatment Plant. The project is intended to add ultraviolet disinfection to address protozoa, improve processes to deal with treated water taste and odour and better address treatment plant residuals. The electrical failures experienced in 2011 as well as the vulnerability assessment project in 2012 indicate capital expenditures need to be made to improve the over-all reliability of the electrical supply systems in the plant and lake pumping station.

## BUFFALO POUND WATER ADMINISTRATION BOARD

The Ozone – BAC pilot plant study commenced October 4, 2011 and was concluded in December 2012. Laboratory staff conducted all of the sampling and the bulk of the analytical work of the Ozone- Biologically Activated Carbon (BAC) pilot plant and the Advanced Oxidation Process pilot study. The pilot plant study concluded that the ozone- BAC process is a potential replacement for the present use of Granular Activated Carbon in a chemically adsorptive mode.

The request for proposals for the supply of UV Disinfection equipment including the reactors and electrical components closed September 20; all proposals were non-compliant and the request for proposals needed to be revised and re-issued.

A meeting with the Water Security Agency Municipal Branch officials was held December 13. This meeting was intended to advise the government officials of progress in the project and to begin the discussion of approvals for implementing the various processes.

### **WASTEWATER FACILITY**

The clarifier underflow removes particulate matter (alum sludge) from the raw water. The effluent stream is directed to alum sludge lagoons where the sludge is deposited and the clear water overflow returns to Buffalo Pound Lake. The sludge from the stockpile location was removed to the Moose Jaw landfill. The sludge from the south-east summer lagoon was excavated to the stockpile location.

### **REGULATORY AND GOVERNMENTAL AFFAIRS**

In December 2002 the provincial government introduced new Water Regulations dealing with water and wastewater facilities. These comprehensive regulations are intended to improve water quality and reporting accountability. The Water Security Agency conducted two inspections of the plant in 2012 in February and August; no deficiencies were noted. Since these regulations have been in place, not one deficiency has been observed on any inspection.

The Buffalo Pound Water Treatment Plant's Permit to Operate was renewed to January 1, 2015. A "Permit to Construct" was received from the Water Security Agency allowing the Buffalo Pound Water Treatment Plant to use alternate coagulants, flocculants and filter aids.

One requirement of the regulations is that the laboratory analytical work required by a water treatment plant's Permit to Operate must be done by an accredited laboratory. The Buffalo Pound laboratory fulfilled all requirements to maintain accreditation from the Canadian Association for Laboratory

Accreditation (CALA). The laboratory participated in four sets of proficiency test analyses.

The Water Regulations require that the plant submit results of the weekly bacteriological, monthly trihalomethane and quarterly major ion analyses promptly to The Water Security Agency and that a Drinking Water Quality and Compliance Report be published annually. The required Drinking Water Quality and Compliance Report is provided in the Appendix. The Buffalo Pound Water Treatment Plant met all sample submission requirements of the plant's operating permit. The plant is in full compliance with the Water Regulations.

Plant operations are subject to the federal National Pollutant Release Inventory (NPRI) Legislation, Canadian Nuclear Safety Commission (CNSC), as well as the Environmental Emergency Regulations. The required inventory submissions were made to the NPRI program. Radioactive substances are used in the laboratory's electron capture detectors. Although the licence requirements for electron capture detectors have been terminated by the CNSC, swipe tests are still conducted as part of the general maintenance program. Swipe tests ensuring the integrity of these detectors were sent to Saskatchewan Labour for analysis; no leakage above the guidelines was detected.

The Plant Superintendent participated in the consultation meetings organized by the Saskatchewan Watershed Authority dealing with the province's proposed 25 Year Water Security Plan. The plan resulted in the creation of the Water Security Agency where all of the provincial government's core water management responsibilities and technical expertise come together to ensure a comprehensive and integrated approach to water management.

### **HUMAN RESOURCES**

In 2012 the Buffalo Pound Water Treatment Plant employed a total staff of 28, consisting of three out-of-scope managers, nine operating staff, five laboratory technologists, five journeyman maintenance persons, four maintenance persons, and two labourers.

The in-scope staff is represented by the Communication, Energy and Paperworker's Union Local 595. The plant's Senior Electrician retired effective October 28, 2011. His position was filled internally and recruitment of another journeyman electrician was completed in early 2012.

## BUFFALO POUND WATER ADMINISTRATION BOARD

The Buffalo Pound Water Administration Board was presented with a Certificate of Achievement Award from the provincial Worker's Compensation Board for the plant's safety record. This is the twenty-fifth consecutive year the plant has been presented with this award. During 2012 there were no lost-time accidents or medical-aid case injuries. Safety training in chlorine container handling was conducted for maintenance staff by the chlorine supplier.

Plant staff participates in the Regina Civic Employees Pension Plan. The plant superintendent represented the Buffalo Pound Water Administration Board participating in many meetings to attempt to address the Pension Plan's large unfunded liabilities. Negotiations in 2012 were able to bring the parties very close to agreeing to plan changes to reduce and eventually eliminate the deficits.

A "Years of Service" awards evening was held April 21; this was the first one specifically held for Buffalo Pound staff.

### **WATERSHED PROTECTION**

The Buffalo Pound Water Treatment Plant continues to be involved in consultation processes dealing with watershed protection in the Upper Qu'Appelle River and Buffalo Pound Lake. The Saskatchewan Watershed Authority and the South Central Enterprise Region are studying options to plan for a flowrate of up to 25 cubic meters per second in the Upper Qu'Appelle River; more than three times the volume the current channel can presently accommodate. One suggestion is the construction and operation of a channel out of the valley, on the south side of the river. The plant superintendent participated in various meetings with WUQWATR, the South Central Enterprise Region and the Regina Regional Opportunities Commission discussing the proposed channel and design parameters. A report on the Upper Qu'Appelle Conveyance Project for the City of Regina Executive Committee was drafted.

The Buffalo Pound Water Administration Board was asked to participate in a series of consultations dealing with the Saskatchewan Watershed Authority's Reservoir Operation Plan for Lake Diefenbaker.

### **MISCELLANEOUS**

Freezing rain and high winds caused a four-hour unplanned power outage on Friday, April 6. Another unplanned outage was required April 25 to place jumpers across a failing SaskPower 72 KV switch; the switch was eventually replaced in September of 2012. Several planned outages were required

for SaskPower to upgrade the electrical supply to the new K+S potash mine.

The lease for the land in Buffalo Pound Provincial Park for the pumping station was renewed in 2012. The new lease will be in effect to March of 2033.

The Plant Engineer and the Plant Superintendent attended the Western Canada Water and Wastewater Association conference in Winnipeg.

The Plant Superintendent and the Assistant Superintendent / Plant Chemist attended the Canadian Water and Wastewater Association conference in Kelowna in October. Six staff attended the annual Saskatchewan Water and Wastewater Association Annual Conference in November.

Meetings of the City of Regina Water Quality Emergency Response Plan Task Force were held in April and October.

The City of Moose Jaw requested the plant review of an engineering report studying Moose Jaw reservoirs.

The City of Moose Jaw repaired a leak on their supply line on August 17.

### **RESEARCH AND ANALYTICAL PROGRAM**

### **PLANT UPGRADE PROCESS EVALUATION**

The plant upgrade projects required that a number of pre-studies be carried out to evaluate the efficiency of various odor unit processes. Three process trains were selected and evaluated at bench or pilot scale using actual plant water as feed. These included: ultra-violet advanced oxidation process (UV-AOP), ozone biological activated carbon (BAC), and long-term use of granular activated carbon (GAC).

Our laboratory staff developed new analytical techniques for hydrogen peroxide and dissolved ozone that were required to properly monitor the various processes. Hundreds of analyses were performed by laboratory staff during the pilot scale evaluation which lasted from November of 2011 until December of 2012. Some sample testing was quite intensive, requiring additional method development. These included simulated distribution tests for longer term disinfection by-product formation potential and the development of odor. Samples requiring highly specialized techniques were prepared for analysis by external laboratories in Canada and the United States.

## BUFFALO POUND WATER ADMINISTRATION BOARD

Although the UV-AOP equipment did not treat odor compounds effectively, the ozone BAC process demonstrated promise as a long-term solution to odor control. Results also confirmed that some biological activity was present in GAC even without ozone pre-treatment.

Laboratory staff worked with the plant engineer to quantify the solid residuals produced during plant operations. Laboratory staff has analyzed filter back washes, clarifier blow downs and lagoon materials for water and solids contents.

### ALTERNATIVE CHEMICAL TREATMENTS

Buffalo Pound Lake experienced a severe bloom of algae during the summer of 2012. The bloom was most intense from late July until early October. Poor water quality continued throughout the winter as the algae died off and began to decompose. Alum doses up to 160 mg/L were required to provide effective coagulation and to ensure good filtered water quality. Unfortunately, these doses of alum were much higher than normally required and dropped the treated water pH to as low as 6.7 as compared to a more typical value of greater than 7.0. These lower pH levels were still within Saskatchewan's drinking water objectives. However the potential for corrosion with specific pipe materials could be greater. Problems with elevated levels of iron were noted in Moose Jaw's distribution system, but not in the distribution system of Regina. Unlike Regina, cast iron pipe still makes up a large portion of Moose Jaw's system especially in the older sections of the City. Iron mobilization within Moose Jaw may also be exacerbated by varying flow regimes. Dissolved or particulate iron is not a health hazard but can impair the taste of water as well as staining plumbing fixtures and clothes.

Laboratory staff evaluated many alternative coagulant products that would not depress pH but still effectively treat the poor quality raw water. Promising alternatives included silica based additives that unfortunately did not raise pH to the desired extent. Organic polymers did not display any benefit in reducing coagulant demands. The best coagulants tested were based on polyaluminum chlorides which are partially neutralized solutions of aluminum chloride. Being less acidic than alum, these coagulants do not depress pH to the same extent as alum. These materials were tested further as they demonstrate the potential for full-scale plant use.

### SUPPLEMENTAL MONITORING

In addition to process monitoring which is required under the terms of the operating permit issued by The Water Security Agency, the Buffalo Pound Water Administration Board undertakes supplementary monitoring as follows:

- Distribution System Monitoring for the City of Regina and Moose Jaw
- Buffalo Pound Lake Monitoring
- Upper Qu'Appelle/Lake Diefenbaker Monitoring

The distribution system monitoring program surveys eight locations in Regina and five in Moose Jaw on a monthly basis. This data assists the cities in their operations and required monitoring. Laboratory resources are also used on an occasional basis to assist the cities in responding to complaints and other issues related to water quality.

Monitoring of Buffalo Pound Lake provides information on the quality of the raw water supply; this facilitates the operation of Plant processes. Considering this longer-term data base is invaluable in evaluating the health of our drinking water source. The eutrophic status of Buffalo Pound Lake and its production of algae blooms that challenge our water treatment processes are well known. The historical data base of lake water quality coupled with hydrological records has demonstrated that moderate inflows from Lake Diefenbaker released by the Qu'Appelle Dam are beneficial in reducing the residence time of water in Buffalo Pound Lake and so moderating the potential for algae blooms. Unfortunately, high water flows through the light alluvial soils of the Upper Qu'Appelle River promotes erosion and the transport of phosphorus, an essential nutrient for algae growth into Buffalo Pound Lake. Cyanobacteria often predominate in natural waters that are deficient in nitrogen as many of those species can "fix" atmospheric nitrogen. By limiting phosphorus, the growth advantage of cyanobacteria over the more benign green algae is reduced.

Monitoring of the Upper Qu'Appelle River / Lake Diefenbaker system provides a database of water quality information that may allow an assessment of long-term water quality trends. The plant's database is frequently requested by provincial agencies and university researchers. The data is provided freely as a public service and as a means of encouraging new research into limnology and water treatment.

### **PERSONAL CARE PRODUCTS AND PHARMACEUTICALS IN THE BUFFALO POUND LAKE WATERSHED**

We all use various pharmaceuticals and chemicals in our everyday lives. These chemicals eventually find their way into surface waters and may impact downstream users of that water. Some compounds such as caffeine, pain killers (ibuprofen and acetaminophen) are often found immediately downstream of human wastewater discharges. Measuring these compounds provides a means of measuring the impact of human activities on the receiving water. The risk to humans from the various metabolites of pharmaceuticals and other products that are excreted or disposed of in wastewater may be small. However, changes in the health of various organisms (e.g. fish) in the immediate vicinity of waste water discharges have been observed elsewhere.

Surveys for various pharmaceutical metabolites and personal care products have been carried out since 2009 in the Upper Qu'Appelle River and Buffalo Pound Lake to identify if any potential problem or concern exists. The suite of analytes tested for has been expanded over the years and now includes musks, hormones, sweeteners and many other compounds.

Sampling was carried out at selected sites including Lake Diefenbaker, the Upper Qu'Appelle River and Buffalo Pound Lake in June. Norflaxacin, an antibiotic was detected (90 parts per trillion) in Lake Diefenbaker water but at no other location in the Upper Qu'Appelle River or Buffalo Pound Lake. By contrast the insect repellent DEET was found in Lake Diefenbaker (20 ppt) as well as in the Upper Qu'Appelle River (45 ppt).

Although pharmaceutical compounds seem to be diluted or removed within Buffalo Pound Lake the fact that they can be detected shows that there are impacts of human use on the our water source. This emphasizes the importance of watershed practices that minimize those impacts.

### **WATERSHED MONITORING**

Monitoring of the Upper Qu'Appelle River watershed including Buffalo Pound Lake is typically carried out on an annual basis. In 2012 watershed sampling was carried out on June 20th. Results of the monitoring for pharmaceuticals and halogens are discussed elsewhere. Lake water quality in 2012 was impacted by the low diversion rates of Lake Diefenbaker water via the Qu'Appelle. Lake Diefenbaker water is of generally better quality than Buffalo Pound Lake water especially when local runoff within the watershed compromises a larger portion of Buffalo Pound Lake's inflow.

Pesticides and herbicides were also sampled and analyzed twice, once in June and again in August. Detectable amounts of 2,4-D were found at the level of parts per trillion (10,000 times lower than the drinking water guideline) in Lake Diefenbaker and the upper Qu'Appelle River.

The long-term watershed data collected by the Buffalo Pound Water Administration Board staff represents a valuable resource for examining water quality trends or issues. Copies of this database are requested regularly by government agencies and water quality researchers. The data is provided freely as a public service and as a means of encouraging new research into limnology and water treatment. Over the past year, researchers from both the University of Regina and University of Saskatchewan have requested and received copies of our raw water data to stimulate new research in water quality monitoring and modelling. The Buffalo Pound Water Treatment Plant assisted in the preparation of an NSERC application from the University of Saskatchewan. Staff from the plant would assist in data gathering and sample analyses in the project. Lake sediments would be analyzed for historical trends in lake water quality and independent sensors on buoys evaluated for monitoring lake water quality in real-time.

Diversions from Lake Diefenbaker via the Upper Qu'Appelle River and Buffalo Pound Lake will increase if irrigated agriculture and industries are developed in Southern Saskatchewan. The watershed data collected since 1979 will provide a baseline for assessing the impacts of these future developments.

## OPERATIONS BUDGET

The 2012 water rate for the cities of Regina and Moose Jaw increased by 2.83% from the 2011 rate to \$216.55 per Megaliter. The electrical rate was set at \$0.07908 per KWH for 2012, a 2.5% increase from 2011.

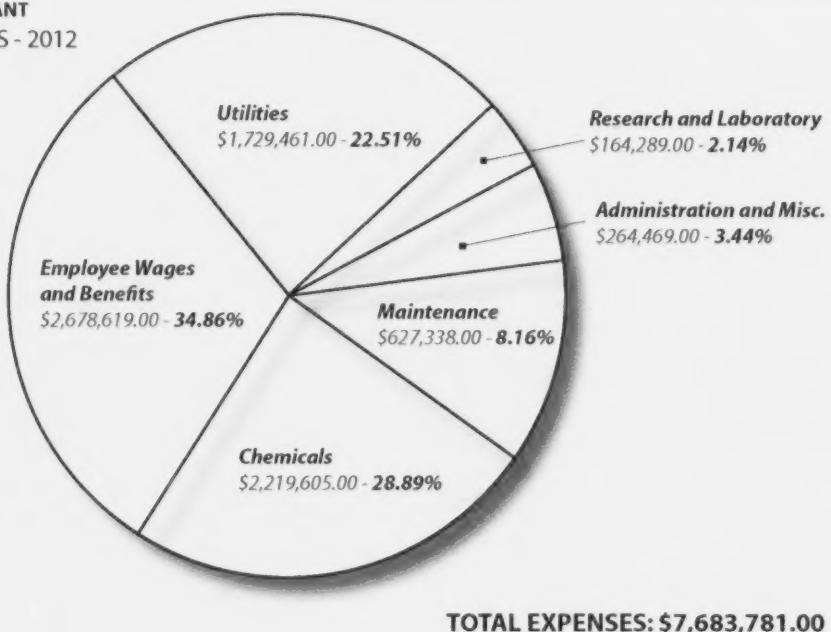
Total sales to the cities in 2012 were 29,189 ML to Regina and 5,540 ML to Moose Jaw. Sales to Regina increased 6.2% from 2011, and sales to Moose Jaw declined 9.9%.

Operations at the Buffalo Pound Water Treatment Plant resulted in a deficit of \$137,371 in 2012. The deficit was primarily caused by chemical expenditures being significantly over plan.

Audited financial statements are contained in Appendix 2. Graph 4 summarizes expenses for 2012 as a percent of the total budget.

**Graph 4**

BUFFALO POUND WATER TREATMENT PLANT  
SUMMARY OF OPERATING EXPENSES - 2012



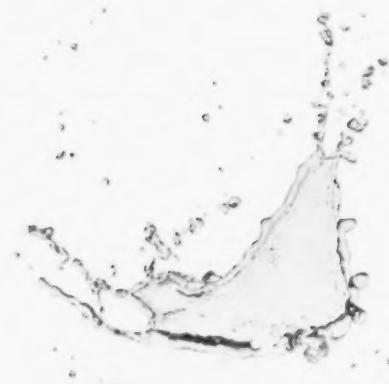
## **APPENDICES**

### **Appendix 1: Water Quality Data – 2012**

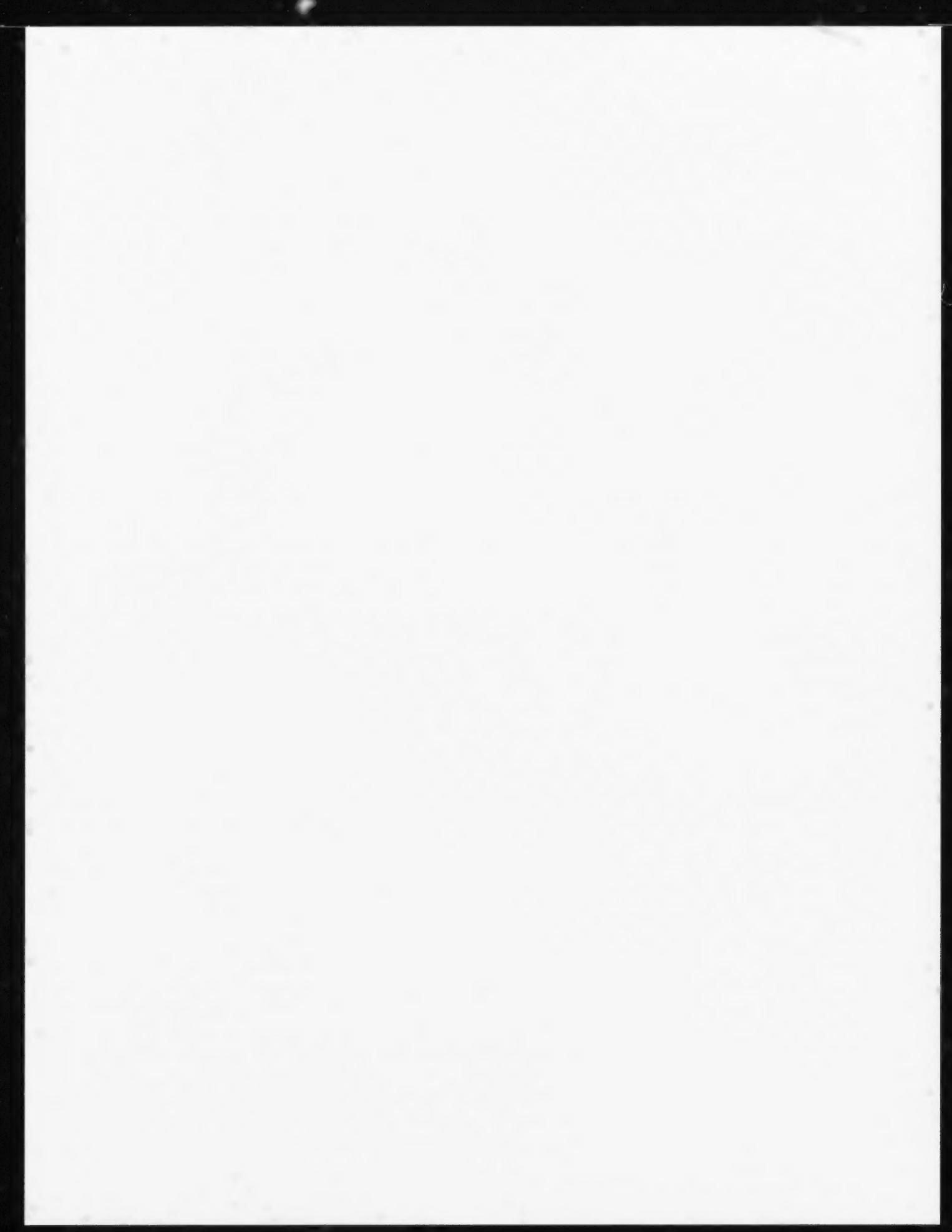
- Drinking Water Quality and Compliance Report for 2012
- Buffalo Pound Water Treatment Plant Laboratory
- Organics Analysis – Saskatchewan Research Council
- Metals Analysis – Saskatchewan Research Council
- Organics Analysis – Alberta Research Council

### **Appendix 2: Audited Financial Statements – 2012**

## APPENDIX 1

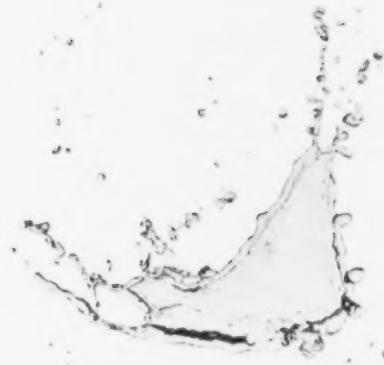


Water Quality Data - 2012



**BUFFALO POUND WATER ADMINISTRATION BOARD**

**BUFFALO POUND  
WATER TREATMENT PLANT  
LABORATORY**



**Analytical Data - 2012**

Moose Jaw / Regina, Saskatchewan  
December 2012

**BUFFALO POUND WATER TREATMENT PLAN**  
**DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2012**

**INTRODUCTION**

The Water Security Agency requires each Permittee to monitor water quality as stipulated under its Permit to Operate a Waterworks. Permittees are also required to prepare an annual report to their customers and the Saskatchewan Water Security Agency summarizing the analytical results of the monitoring in a report entitled "Drinking Water Quality and Compliance Report."

For more information about the meaning and type of sample refer to the Water Security Agency's "Municipal Drinking Water Quality Monitoring Guidelines, on the associated website: <https://www.wsask.ca/>

The Guidelines for Canadian Drinking Water Quality are developed by the Federal-Provincial-Territorial Committee on Drinking Water and are published by Health Canada. The province of Saskatchewan utilizes the guidelines in issuing Permits to Operate for regulated water works. Guidelines for chemical and physical parameters are either:

1. health based and listed as a Maximum Acceptable Concentrations (MAC) or Interim Maximum Acceptable Concentration (IMAC);
2. based on aesthetic considerations and listed as an Aesthetic Objectives (AO); or
3. established based on operational considerations and listed as an Operational Guidance values (OG).

Throughout this document the analytical values are reported as well as the units of measure. Many parameters are not detected in the treated water. If a parameter is not detected a "less than sign" (<) is used. The detection limit for the parameter is indicated following the "less than sign" (<).

**WATER QUALITY STANDARDS - BACTERIOLOGICAL QUALITY**

According to its Permit to Operate a Waterworks the Buffalo Pound Water Treatment Plant is required to analyze one sample every week from the treated water for Bacteriological Quality. Coliforms were never detected in the treated water.

Parameter	Limit	Number of Samples Submitted	Number of Samples Exceeding Limit
Total Coliforms	0 per 100 ml	52	0
Background Organisms	<200 per 100 ml	52	0

**WATER QUALITY STANDARDS - FILTER TURBIDITY**

The Buffalo Pound Water Treatment Plant is required to monitor the effluent turbidity from all twelve filters on a Continuous Basis. The turbidity from each individual filter

## BUFFALO POUND WATER ADMINISTRATION BOARD

shall be less than 0.3 NTU, 95% of the time. The turbidity shall not exceed 0.3 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU. If, on those occasions when the monthly average of the source water turbidity is less than 1.5 NTU, the water turbidity levels from each filter must be less than 0.2 NTU, 95% of the time, the turbidity shall not exceed 0.2 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU.

This Plant's SCADA Control System automatically generates an alarm if a filter effluent turbidity exceeds 0.3 NTU. If the turbidity exceeds 0.4 NTU at any time, the Plant's SCADA Control System automatically closes the filter effluent valve, turning off the filter. The plant's operating permit requires on-line turbidity monitoring on the effluent of each of its twelve filters. A problem with the turbidity monitor or data transfer system to the plant's SCADA requires a shutdown of the affected filter. To address this possibility the plant has a second independent turbidimeter on each filter so that continuous monitoring can be maintained even if the first turbidimeter fails.

### **WATER QUALITY STANDARDS - FLOURIDE**

The Buffalo Pound Water Treatment Plant adds fluoride to the water pumped to the City of Moose Jaw and is required to monitor the fluoride level in that water on a continuous basis. The Maximum Acceptable Concentration (MAC) is 1.5 mg/l. Alarms signal a high residual dose at 1.3 mg/L. The maximum recorded level of fluoride via a laboratory analysis for water pumped to Moose Jaw was 0.74 mg/L. The annual average recorded was 0.53 mg/L.

### **WATER QUALITY STANDARDS - CHLORINE RESIDUAL**

To ensure adequate disinfection the Buffalo Pound Water Treatment Plant must monitor the chlorine residual of the treated water on a continuous basis and the free chlorine residual shall not be less than 0.1 milligrams per litre in the clearwell. The normal operating range for the free chlorine residual in the treated water is 0.9 to 1.1 mg/l. The SCADA control system will automatically shut off pumping to the Cities if the chlorine level is less than 0.5 mg/l. A high level chlorine alarm will alert the operator if chlorine levels exceed 1.3 mg/l.

### **WATER QUALITY STANDARDS - CHEMICAL - GENERAL**

As part of the plant's "Permit to Operate" a general chemical analysis is required once in every three month period from the treated water. Only two of these parameters have an established Maximum Acceptable Concentration (MAC). Eight others have an Aesthetic Objective (AO) which is desirable but has no impact on human health.

Parameter (mg/l) unless stated	Feb. 13	May 14	Aug. 13	Nov. 12	MAC	No. of Samples Exceeding MAC or AO
Nitrate	0.31	0.21	0.35	<0.04	45	0
Fluoride	0.12	0.12	0.08	0.09	1.5	0
					AO	
Alkalinity	163	138	63	82	500	0
Chloride	27.04	20.76	27.70	25.68	250	0

BUFFALO POUND WATER ADMINISTRATION BOARD

Hardness	259	209	167	203	800	0
Magnesium	30.0	23.0	22.5	24.8	200	0
pH (pH units)	7.40	7.32	6.90	6.77	6.5 – 9.0	0
Sodium	84.9	59.0	69.7	74.5	300	0
Sulphate	247.6	191	223.7	260	500	0
Total Dissolved Solids	550	416	420	468	1500	0
Carbonate	ND	ND	ND	ND		
Calcium	56.6	48.8	28.5	39.6		
Conductivity (uS/cm)	850	670	660	735		
Bicarbonate	199	168	77	99		

ND – Not Detected

**WATER QUALITY STANDARDS - CHEMICAL - HEALTH**

The Buffalo Pound Water Treatment Plant is required to sample the treated water for the following parameters once in every six month period. Eight of these parameters have an established MAC. Five parameters have guideline values which establish a target that could be expected from well functioning water treatment plants or are aesthetic objectives for the taste or appearance of treated water.

Parameter (mg/l)	May 23	Oct. 15	MAC	Number of Samples Exceeding Limit
Arsenic	0.0004	0.0005	0.010	0
Barium	0.072	0.058	1.0	0
Boron	0.06	0.09	5.0	0
Cadmium	<0.00001	<0.00001	0.005	0
Chromium	<0.0005	<0.0005	0.05	0
Lead	<0.0001	<0.0001	0.01	0
Selenium	0.0004	0.0003	0.01	0
Uranium	0.0006	<0.0001	0.02	0
			Operational Guideline	
Aluminum	0.020	0.012	0.1	0
Copper	<0.0002	<0.0002	1.0	0
Iron	<0.0005	<0.0005	0.3	0
Manganese	<0.0005	0.0005	0.05	0
Zinc	<0.0005	<0.0005	5.0	0

**WATER QUALITY STANDARDS - PESTICIDES**

Once per year the Buffalo Pound Water Treatment Plant is required to have the treated water analyzed for the following pesticides. Those noted on the permit are indicated below; the entire pesticide analysis is noted in the Appendix. Six of the parameters listed below have an established MAC. Six parameters have Interim Maximum Acceptable Concentrations (IMAC) which means that they are being reviewed and subject to change. Two parameters have guidelines and three parameters have no MAC, IMAC or guideline but are required by our regulatory permits to be monitored.

**BUFFALO POUND WATER ADMINISTRATION BOARD**

Parameter (mg/l)	Mar. 13	MAC	Number of Samples Exceeding Limit
Carbofuran	<0.002	0.09	0
Chlorpyrifos	<0.000005	0.09	0
Dicamba	<0.000005	0.12	0
Diclofop-methyl	<0.00002	0.009	0
Malathion	<0.000005	0.19	0
Pentachlorophenol	<0.0001	0.06	0
		IMAC	
Atrazine	<0.000005	0.005	0
Bromoxynil	<0.000005	0.005	0
Dichlorophenoxyacetic Acid 2,4 (2,4-D)	0.000016	0.1	0
Dimethoate	<0.00005	0.02	0
Picloram	<0.000005	0.19	0
Trifluralin	<0.000005	0.045	0
		Operational Guideline	
Glyphosate	<0.0002	0.28	0
MCPA	<0.000005	0.10	0
Dichlorprop 2-4DP	<0.000005	N/A	0
Ethalfuralin	<0.000005	N/A	0
Triallate	<0.000005	N/A	0

**WATER QUALITY STANDARDS - DISINFECTION BY-PRODUCT - TRIHALOMETHANES**

As part of the plant's "Permit to Operate" an analysis for Trihalomethanes is required once per month from the treated water. The MAC is 0.1 milligrams per litre, or, 100 micrograms per litre (parts per billion) for total trihalomethanes on an annual average. The annual average of 47 micrograms per litre is well below the MAC.

Parameter (ug/l)	Jan. 2	Feb. 8	Mar. 7	Apr. 2	May 7	Jun. 4
Chloroform	30	36	33	40	33	1
Bromodichloromethane	19	21	17	19	17	<1
Dibromochloromethane	5	8	6	6	5	<1
Bromoform	<1	<1	<1	<1	<1	<1
Total Trihalomethanes	54	64	56	65	56	1
	Jul. 9	Aug. 8	Sep. 10	Oct. 1	Nov. 12	Dec. 3
Chloroform	20	51	36	37	22	21
Bromodichloromethane	1	13	16	17	11	12
Dibromochloromethane	<1	1	2	3	2	3
Bromoform	<1	<1	<1	<1	<1	<1
Total Trihalomethanes	22	65	54	57	35	36

BUFFALO POUND WATER ADMINISTRATION BOARD

**WATER QUALITY STANDARDS - DISINFECTION BY-PRODUCT - HALOACETIC ACIDS (HAA5'S)**

The Buffalo Pound Water Treatment Plant is obligated to sample for Haloacetic Acids every three months. The annual average of quarterly samples (20 ug/L) was well below the MAC. The results are as follows:

Parameter (ug/l)	Jan. 17	Apr. 2	Jul. 17	Oct. 15	Annual Average	MAC	Number of Samples Exceeding Limit
HAA5	37	43	<5	<5	20	80	0

**WATER QUALITY STANDARDS - CYANIDE & MERCURY**

The Buffalo Pound Water Treatment Plant is required to submit two (2) samples per year for analysis for Cyanide and Mercury.

Parameter (mg/l)	May 23	Oct. 15	MAC	Number of Samples Exceeding Limit
Cyanide	<0.0001	<0.0001	0.2	0
Mercury	<0.00001	<0.00001	0.001	0

**WATER QUALITY STANDARDS - ORGANICS PLUS MICROCYSTIN**

The Buffalo Pound Water Treatment Plant is required to submit one (1) sample per year for analysis for various organics including Microcystin. Those noted on the permit are indicated below; the entire organic analysis is noted in the Appendix.

Parameter (mg/l)	Mar. 12	MAC	Number of Samples Exceeding Limit
Benzene	<0.0001	0.005	0
Benzo(a)pyrene	<0.00001	0.00001	0
Carbon Tetrachloride	<0.0001	0.005	0
Dichlorobenzene 1,2	<0.0001	0.2	0
Dichlorobenzene 1,4	<0.0001	0.005	0
Dichloroethylene 1,1	<0.0001	0.014	0
Dichloromethane	<0.002	0.05	0
Dichlorophenol 2,4	<0.0001	0.9	0
Ethylbenzene	<0.0001	0.0024	0
Monochlorobenzene	<0.0001	0.08	0
Toluene	<0.0001	0.024	0
Tetrachlorophenol 2,3,4,6	<0.0001	0.1	0
Trichloroethylene	<0.0001	0.05	0
Trichlorophenol 2,4,6	<0.0001	0.005	0
Vinyl Chloride	<0.0005	0.002	0
Xylenes	<0.0001	0.300	0
Microcystin	<0.0005 (Jul. 17)	0.0015	0
		IMAC	
Dichoroethane 1,2	<0.0001	0.005	0

**BUFFALO POUND WATER ADMINISTRATION BOARD**

**2012 - BUFFALO POUND WATER QUALITY DATA  
RAW LAKE WATER**

PAGE 1

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX	
<b>PHYSICAL</b>																	
Colour (Apparent)	Pt/Co	15	25	25	25	20	25	35	75	60	30	30	20	32	15	75	
Conductivity	µS/cm	809	829	820	665	653	657	649	629	646	676	708	767	703	627	829	
Bench Diss. Oxygen	mg/L	14.9	12.4	10.8	10.5	9.2	8.8	6.9	8.8	9.1	9.1	12.0	8.8	10.1	6.9	14.9	
Bench Diss. Oxygen	%	111.8	97.0	87.3	85.6	90.0	88.7	80.3	100.6	90.0	76.7	84.7	64.3	88.1	64.3	111.8	
ON-LINE Diss. Oxygen	%	123.3	133.4	120.5	110.6	101.6	100.3	107.0	111.8	102.7	98.3	97.3	94.0	109.0	87.3	147.0	
Odour	T.O.N.	34	54	48	71	74	66	134	242	233	67	32	32	88	23	350	
pH	pH units	8.49	8.63	8.27	8.40	8.33	8.45	8.56	9.05	9.21	8.64	8.29	8.05	8.52	7.90	9.24	
Temperature	° C	3.7	5.0	6.1	6.8	12.1	17.2	23.2	20.7	15.5	7.4	1.4	2.4	10.1	1.1	24.9	
Turbidity	NTU	1.4	1.9	2.3	2.8	3.3	3.3	5.1	13.0	6.6	5.4	2.9	1.2	4.0	0.9	13.5	
TDS	mg/L	520	536	538	504	408	422	434	398	420	422	438	458	398	538		
TDS	mg/L (calc)	638	664	662	528	521	529	507	481	483	518	554	607	558	481	664	
Langelier Index (RTW)	pH units (calc)	0.85	0.92	0.56	0.52	0.69	0.89		1.18	1.27	0.76			0.85	0.52		
<b>MAJOR CONSTITUENTS</b>																	
Alkalinity(p)	mg/L CaCO <sub>3</sub>	1	4	<DL	2	1	4	5	7	16	6	<DL	<DL	3	<DL	16	
Alkalinity(total)	mg/L CaCO <sub>3</sub>	193	204	211	180	167	169	145	125	127	140	160	175	165	124	211	
Bicarbonate	mg/L	232	240	258	215	201	201	166	136	117	155	194	213	194	117	258	
Carbonate	mg/L	2	5	<DL	2	1	5	5	8	19	8	<DL	<DL	4	<DL	19	
Calcium	mg/L	52	57	59	49	50	49	41	30	30	35	40	46	45	30	59	
Magnesium	mg/L	28	30	30	24	23	22	23	24	24	25	29	25	22	30		
Hardness (total)	mg/L CaCO <sub>3</sub>	250	263	267	214	208	218	200	169	170	181	207	230	215	169	267	
Sodium	mg/L	84	84	79	62	59	61	62	69	76	77	74	79	72	59	84	
Potassium	mg/L	8.6	8.5	8.0	6.4	6.4	6.3	6.7	6.7	6.6	6.6	6.6	6.8	7.0	6.3	8.6	
Sulphate	mg/L	210	211	202	158	159	161	162	176	183	185	192	209	184	158	211	
Chloride	mg/L	23.4	23.0	23.0	17.4	17.2	17.5	18.4	20.4	22.5	22.3	22.0	23.7	20.9	17.2	23.7	
<b>TRACE CONSTITUENTS</b>																	
Aluminum (dissolved 0.45µ)	ug/L	<DL	7	<DL	8	18	18	43	32	108				27	<DL	108	
Ammonia N	mg/L N	<DL	<DL	0.05	<DL	<DL	<DL	0.19	0.23	<DL				0.07	<DL	0.29	
BOD (5-day)	mg/L	4.9	14.6	4.3	2.8	2.6	2.3	3.5	7.2		4.4	5.7	3.7	5.1	2.3	14.6	
Bromide	mg/L	0.11	<DL	0.10	0.08	0.07	0.09	0.10	0.10	0.11	0.11	0.10	0.11	0.09	<DL	0.11	
Chlorophyll a	µg/L	19	17	24	10	7	12	49	129	112	30	33	13	45	7	134	
Fluoride	mg/L	0.20	0.19	0.19	0.17	0.19	0.16	0.17	0.18	0.18	0.19	0.20	0.20	0.18	0.16	0.20	
Iron (dissolved)	mg/L	0.02	<DL	<DL	0.02	<DL	0.02	<DL	<DL	<DL	<DL	<DL	0.02	<DL	<DL	0.02	
Manganese (dissolved)	mg/L	<DL	<DL	0.04	<DL	0.08	0.01	<DL	0.08								
Nitrate	mg/L	0.08	<DL	<DL	0.07	0.07	<DL	<DL	0.08								
Organic N	mg/L N	0.08	0.81	0.81	0.55	0.48	0.43	0.73	1.15	1.75	0.90		0.69	0.85	0.43	1.75	
Raw TOC	mg/L C (UV)	7.5	7.1	7.5	6.5	5.9	5.9	7.2	12.0	11.8	8.6	7.9	7.3	8.0	5.6	15.2	
Raw DOC (GF diss)	mg/L C (UV)	7.1	6.9	6.9	5.8	5.3	5.5	6.2	7.5	8.7	7.6	6.9	7.1	6.8	5.2	9.0	
UV absorbance @ 254nm	Abs 10cm	1.392	1.395	1.354	1.104	0.973	0.952	1.087	1.205	1.293	1.164	1.070	1.090	1.176	0.923	1.437	
SUVA	L / mg m	1.956	2.017	1.970	1.904	1.843	1.739	1.638	1.604	1.483	1.529	1.550	1.541	1.736	1.394	2.141	
PreFM UV abs @ 254nm	Abs 10cm	1.122	1.122	1.092	0.880	0.799	0.770	0.871	0.979	1.064	0.959	0.894	0.931	0.955	0.750	1.164	
Phosphated(ortho)	µg/L P	15	9	6	7	10	10	3	5	5	7	6	5	7	3	15	
Phosphate(total)	µg/L P	59	55	59	57	59	56	81	164	147	94	55	45	84	45	176	
Silica (SiO <sub>3</sub> )	mg/L	6.3	4.9	5.0	3.0	2.1	0.3	1.3	5.1	6.2	6.0	5.1	4.3	0.3	6.3		
Sulphide	µg/L																

Continued...

# BUFFALO POUND WATER ADMINISTRATION BOARD

## 2012 - BUFFALO POUND WATER QUALITY DATA

### RAW LAKE WATER

PAGE 2

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
<b>TRACE CONSTITUENTS</b>																
PreFM																
TTHM's (total)	µg/l.(calc)	53	61	59	51	46	54	74	85	78	48	31	35	56	30	89
Chloroform	µg/l.	29	35	34	32	27	30	45	55	50	28	18	20	33	17	58
Bromodichloromethane	µg/l.	17	18	18	15	14	17	22	24	22	14	9	9	17	9	25
Chlorodibromomethane	µg/l.	7	7	7	5	5	7	7	7	6	5	4	4	6	4	8
Bromoform	µg/l.	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	1	<DL	<DL	1
<b>BIOLOGICAL</b>																
Blue Green Algae (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	78	2596	12883	18056	2849	19	<DL	2857	<DL	23889
Green Algae (x10^-3)	per litre	5469	1139	1725	1634	1218	1381	1738	2734	11667	6342	3533	1047	3280	256	17555
Diatoms (x10^-3)	per litre	98	320	56	47	115	319	218	139	278	115	89	78	152	<DL	1111
Flagellates (x10^-3)	per litre	151	508	667	1211	742	695	1282	5294	6250	1169	506	212	1475	<DL	12222
Crustaceans	per litre	67	153	115	156	188	125	49	26	40	53	28	25	88	<3	455
Nematodes (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Rotifers (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Other (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Total Green & B-G	per litre	5469	1139	1725	1634	1231	1458	4333	15617	29722	9191	3553	1047	1998	878	2433
<b>BACTERIOLOGICAL</b>																
Total Coliforms	per 100 ml	1	<DL	5	8	32	65	1060	8750	1250	224	11	<DL	886	<DL	11000
Total Coliforms (background)	per 100 ml	37	35	230	316	649	3500	37220	62500	59375	1858	273	72	13284	10	143000
Faecal Coliforms	per 100 ml	<DL	<DL	4	5	4	3	9	18	7	<DL	<DL	4	<DL	38	
Standard Plate Count	per 1 ml	91	20	50	64	69	175	1203	4043	924	95	30	14	549	2	12390
<b>CHEMICAL DOSES</b>																
Alum	mg/l.	81	75	69	61	54	51	78	119	150	144	149	149	99	50	155
Alum/Raw DOC	ratio	11.39	10.85	10.00	10.58	10.23	9.36	11.65	15.75	17.22	19.00	21.57	21.05	14.11	8.93	22.06
Alum-DOC Stoch	ratio	0.92	0.88	0.81	0.86	0.83	0.76	0.94	1.28	1.40	1.54	1.75	1.71	1.14	0.72	1.79
Chlorine-pre	mg/l.	3.4	3.7	4.2	3.6	3.0	3.2	5.8	7.5	6.8	4.1	3.0	3.9	4.3	2.5	8.2
Chlorine-intermed	mg/l.															
Chlorine-post	mg/l.	1.3	1.1	1.0	1.0	1.2	1.5	1.6	1.5	1.5	1.5	1.6	1.5	1.4	0.8	1.7
Plant Flow	MLD	91.4	83.0	79.8	84.5	109.2	103.5	116.4	136.8	130.8	104.4	96.8	90.0	102.1	69.0	143.0
Qu'Appelle Dam Flow	cu.m/s	1.5	1.5	1.5	1.7	2.3	2.6	4.3	4.1	2.6	3.0	2.4	3.9	2.7	1.3	4.8
Fluoride (Set Point for MJ)	mg/l.	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Powdered Carbon	mg/l.	12.5	10.0	10.0	12.5	15.0								11.7	10.0	15.0
CPAC Train A	mg/l.															
CPAC Train B	mg/l.															
Total Chlorine dose	mg/l. (Calc)	4.7	4.8	5.2	4.6	4.2	4.8	7.4	9.1	8.3	5.6	4.6	5.4	5.7	3.8	9.7
Date GAC's ON														07-May		
Date GAC's OFF														06-Jan		
Date Ice ON Lake																
Date Ice OFF Lake															04-Apr	
Date PAC ON															05-Jan	
Date PAC OFF																
<b>Chlorine Residuals Exit Plant (week avg.)</b>																
Free Chlorine	mg/l.	1.13	1.14	1.09	1.15	1.07	1.08	1.10	1.11	1.07	1.07	1.06	1.13	1.10	1.02	1.21
Combined Chlorine	mg/l.	0.34	0.38	0.37	0.31	0.11	0.12	0.16	0.18	0.20	0.20	0.22	0.23	0.23	0.05	0.41

# BUFFALO POUND WATER ADMINISTRATION BOARD

## 2012 - BUFFALO POUND WATER QUALITY DATA TREATED WATER

PAGE 3

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX
<b>PHYSICAL</b>																
Colour (Apparent)	Pt/Co	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Conductivity	µS/cm	846	850	841	681	670	670	671	660	687	714	735	792	735	660	850
Diss. Oxygen	mg/L	12.6	12.5	11.7	11.3	9.5	8.8	8.2	7.9	10.0	9.2	12.9	11.9	10.6	7.9	12.9
% Sat. Diss. Oxygen	%	95.9	97.4	94.4	93.2	91.1	92.0	96.1	91.3	98.9	79.0	91.2	86.8	92.3	79.0	98.9
Odour(Dechlorinated)	T.O.N.	5	5	6	9	3	<1	1	2	3	4	4	4	4	<1	10
PreGAC Odour	T.O.N.	10				10	17	71	116	86	15	14	14	43	9	160
Odour Removal by Coagulation and Filtration	%	82.0%	90.5%	87.8%	87.8%	91.0%	75.3%	42.3%	52.2%	64.6%	75.8%	55.2%	57.1%	71.7%	25.5%	100.0%
Odour Removal Overall	%	85.0%	90.5%	87.8%	87.8%	96.5%	99.7%	99.4%	99.2%	98.4%	93.6%	87.9%	88.3%	92.8%	75.0%	100.0%
PreFM pH	pH units	8.17	8.36	7.97	8.09	8.07	8.18	8.15	8.40	8.89	8.33	8.08	7.45	8.17	6.71	8.92
Coagulation pH - Channel 1	pH units	7.09	7.21	7.16	7.17	7.17	7.24	6.98	6.59	6.42	6.51	6.58	6.56	6.89	6.40	7.29
Coagulation pH - Channel 2	pH units	7.08	7.22	7.18	7.19	7.19	7.24	6.95	6.60	6.41	6.56	6.56	6.58	6.90	6.35	7.26
Clearwell pH	pH units	7.10	7.41	7.32	7.33	7.39	7.51	7.23	6.89	6.73	6.79	6.80	6.83	7.10	6.67	7.53
Temperature	°C	3.7	4.7	5.6	6.9	11.8	18.1	23.5	21.1	15.6	7.4	1.4	2.4	10.1	1.1	24.6
Turbidity	NTU	0.07	0.08	0.08	0.07	0.07	0.08	0.09	0.12	0.11	0.07	0.07	0.07	0.08	0.05	0.18
Total Dissolved Solids	mg/L	542	550	548	486	416	418	436	420	436	444	468		469	416	550
Total Dissolved Solids	mg/L(calc)	635	658	655	520	519	520	497	460	481	510	536	583	548	460	658
Turbidity Log Removal	(calc)	1.27	1.38	1.42	1.62	1.65	1.59	1.74	2.03	1.81	1.88	1.57	1.23	1.59	1.13	2.12
Langelier Index (RTW)	pH units (calc)	-0.80	-0.36	-0.39	-0.54	-0.41	-0.14		-1.26	-1.69	-1.46			-0.78	-1.69	-0.14
<b>MAJOR CONSTITUENTS</b>																
Alkalinity(p)	mg/L CaCO <sub>3</sub>	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Alkalinity(total)	mg/L CaCO <sub>3</sub>	143	163	174	137	138	141	112	63	52	68	82	95	114	52	174
Bicarbonate	mg/L	174	199	212	167	168	172	136	77	63	82	99	116	139	63	212
Carbonate	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Calcium	mg/L	53	57	58	48	49	48	41	29	28	33	40	45	44	28	58
Magnesium	mg/L	27	30	29	24	23	22	23	23	24	24	25	28	25	22	30
Hardness (total)	mg/L CaCO <sub>3</sub>	252	259	267	211	209	219	199	166	169	151	203	226	211	151	267
Sodium	mg/L	84	85	80	62	59	61	61	70	76	77	75	76	72	59	85
Potassium	mg/L	8.7	8.6	7.9	6.5	6.5	6.5	6.7	6.9	6.6	6.7	6.6	6.6	7.1	6.5	8.7
Sulphate	mg/L	255	248	237	188	191	188	203	224	249	254	260	279	231	188	279
Chloride	mg/L	27.5	27.0	26.8	21.4	20.8	21.7	25.4	27.7	28.0	26.5	25.7	28.2	25.6	20.8	28.2
<b>TRACE CONSTITUENTS</b>																
<b>CLEAR WELL</b>																
Aluminum (dissolved 0.45µ)	µg/L Chart	34	53	52	21	17	28	21	23	13				29	13	53
Aluminum (total)	µg/L Chart	59	53	52	27	20	28	20	28	66				39	20	66
Aluminum (total 12 mo avg)	µg/L	56	47	44	44	43	44	44	45	49				10	<DL	53
Aluminum (particulate)	µg/L (Calc)	25	<DL	<DL	6	<DL	<DL	<DL	<DL	53						
<b>Mixed Media Filter A</b>																
Aluminum (total)	µg/L	57	58	46	25	41	51	47	72	97				55	25	97
<b>Mixed Media Filter L</b>																
Aluminum (total)	µg/L	50	49	46	31	37	52	58	82	194				67	31	194
<b>PREGAC</b>																
Aluminum (dissolved)	µg/L					37	42	36	52	19				37	19	52
Aluminum (total)	µg/L Chart					40	50	43	94	164				78	40	164

Continued...

**BUFFALO POUND WATER ADMINISTRATION BOARD**

**2012 - BUFFALO POUND WATER QUALITY DATA**

**TREATED WATER**

PAGE 4

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX		
Ammonia N	mg/L N	<DL	0.10	0.05	<DL	<DL	0.07	<DL	<DL	0.10								
Bromide	mg/L	<DL	<DL	0.10	<DL	<DL	0.10											
Fluoride	mg/L	0.11	0.12	0.12	0.11	0.13	0.12	0.10	0.08	0.06	0.08	0.09	0.07	0.10	0.06	0.13		
Fluoride (MJ dose by ISE)	mg/L (wk avg)	0.65	0.71	0.64	0.62	0.60	0.60	0.53	0.50	0.29	0.39	0.39	0.45	0.53	0.22	0.74		
Iron (dissolved)	mg/L	<DL	<DL	0.02	0.02	<DL	0.02	<DL	<DL	<DL								
Iron (total)	mg/L	0.02	<DL	0.02	0.02	<DL	0.02	<DL	<DL	0.02								
Manganese (dissolved)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	0.01	<DL	<DL	<DL	<DL	0.02	<DL	<DL	0.02		
Manganese (total)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	0.01	<DL	<DL	<DL	<DL	0.02	<DL	<DL	0.02		
Nitrate	mg/L N	0.07	0.07	<DL	<DL	<DL	0.06	0.06	0.08	<DL	<DL	<DL	<DL	<DL	<DL	0.08		
Organic N	mg/L N	0.29	0.34	0.36	0.22	<DL	0.08	0.16	0.20	0.17	0.13	0.21	0.20	<DL	0.20	0.36		
CW TOC	mg/L C	4.7	4.9	5.1	4.2	1.9	1.3	2.1	2.5	2.1	2.3	2.7	3.0	3.0	0.5	5.2		
CW DOC (GF diss)	mg/L C	4.7	4.9	5.1	4.2	1.9	1.3	2.1	2.5	2.1	2.3	2.7	3.0	3.0	0.5	5.2		
PreGAC DOC (GP diss)	mg/L C					3.9	4.1	4.4	4.4	3.9	3.7	3.6	3.8	4.0	3.5	4.7		
DOC Removal by Coagulation & Filtration	% Removal	34.1%	28.9%	26.2%	28.4%	25.4%	25.1%	29.4%	41.6%	55.0%	51.5%	48.5%	46.6%	37.2%	22.6%	57.3%		
DOC Removal by GAC Filtration	% Removal							85.2%	67.8%	52.7%	43.6%	47.8%	38.3%	24.0%	21.2%	44.9%	15.4%	86.8%
Total DOC (% Removal)	% Removal	34.1%	28.9%	26.2%	28.4%	63.3%	76.1%	66.7%	67.1%	76.5%	70.1%	60.9%	58.0%	55.0%	23.5%	90.6%		
CW Organic Carbon (diss @ 254nm)	Abs 10cm	0.624	0.675	0.685	0.547	0.209	0.069	0.146	0.176	0.156	0.194	0.249	0.299	0.333	0.016	0.720		
PreGAC Organic Carbon (diss @ 254nm)	Abs 10cm							0.512	0.516	0.510	0.494	0.486	0.464	0.463	0.482	0.490	0.450	0.530
Conventional SUVA	L / mg m	1.323	1.374	1.350	1.317	1.281	1.260	1.145	1.169	1.240	1.260	1.304	1.277	1.273	1.111	1.479		
CW SUVA	L / mg m	1.323	1.374	1.350	1.317	0.691	0.516	0.663	0.711	0.760	0.851	0.919	1.006	0.953	0.272	1.479		
Phosphate(ortho)	µg/L P	<DL	<DL	<DL	<DL	19	5	<DL	<DL	3	<DL	<DL	<DL	2	<DL	19		
Phosphate(total)	µg/L P	5	3	9	7	21	8	7	5	8	6	3	<DL	7	<DL	21		
Silica (SiO <sub>2</sub> )	mg/L	5.8	4.7	4.7	2.8	2.3	0.7	1.2	4.5	5.6	5.6	5.6	4.4	4.0	0.7	5.8		

Jan 30, 2012

## ***SRC ANALYTICAL***

422 Downey Road  
Saskatoon, Saskatchewan, Canada  
S7N 4N1  
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
2476 Victoria Avenue  
Box 1790  
Regina, SK S4P 3C8  
Attn: Dan Conrad

Date Samples Received: Jan-20-2012

Client P.O.: 17003

---

This is a final report.

Organics results have been authorized by Pat Moser, Supervisor

ICP results have been authorized by Keith Gipman, Supervisor

Inorganics and Radiochemistry results have been authorized by Jeff Zimmer, Supervisor

SLOWPOKE-2 results have been authorized by Dave Chorney

---

\* Test methods and data are validated by the laboratory's Quality Assurance Program.

\* Routine methods follow recognized procedures from sources such as

- \* Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
- \* Environment Canada
- \* US EPA
- \* CANMET

\* The results reported relate only to the test samples as provided by the client.

\* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

\* Additional information is available upon request.

Jan 30, 2012

***SRC ANALYTICAL***

422 Downey Road  
 Saskatoon, Saskatchewan, Canada  
 S7N 4N1  
 (306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
 2476 Victoria Avenue  
 Box 1790  
 Regina, SK S4P 3C8  
 Attn: Dan Conrad

Sample #:	<b>2012002924</b>	Client PO #:	<b>17003</b>
Date Sampled:	<b>Jan 17, 2012</b>	Date Received:	<b>Jan 20, 2012</b>
Sample Matrix:	<b>WATER</b>		
Description:	<b>SK05JG0017 01/17/2012 08:33 BUFFALO POUND WATER TREATMENT PLANT - CLEARWELL</b>		

Analyte	Units	Result	DL	Date Entered
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**Organic Chemistry**

Monochloroacetic acid	ug/L	<5	5	Jan 27, 2012
Monobromoacetic acid	ug/L	5	1	Jan 27, 2012
Dichloroacetic acid	ug/L	13	0.5	Jan 27, 2012
Trichloroacetic acid	ug/L	16	1	Jan 27, 2012
Dibromoacetic acid	ug/L	3	0.5	Jan 27, 2012
Halo Acetic Acids 5, Total (calc.)		37	5	Jan 27, 2012
Bromochloroacetic acid	ug/L	9	0.5	Jan 27, 2012

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Apr 18, 2012

## ***SRC ANALYTICAL***

422 Downey Road  
Saskatoon, Saskatchewan, Canada  
S7N 4N1  
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
2476 Victoria Avenue  
Box 1790  
Regina, SK S4P 3C8  
Attn: Dan Conrad

Date Samples Received: Apr-03-2012

Client P.O.: 17003

---

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Apr 18, 2012

***SRC ANALYTICAL***

422 Downey Road  
 Saskatoon, Saskatchewan, Canada  
 S7N 4N1  
 (306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
 2476 Victoria Avenue  
 Box 1790  
 Regina, SK S4P 3C8  
 Attn: Dan Conrad

Sample #: **2012012019**  
 Date Sampled: **Apr 02, 2012**  
 Sample Matrix: **WATER**  
 Description: **SK05JG0017 04/02/2012 08:35 BUFFALO POUND  
 WATER TREATMENT PLANT - CLEARWELL**

Client PO #: **17003**  
 Date Received: **Apr 03, 2012**

Analyte	Units	Result	DL
<b>Organic Chemistry</b>			
Monochloroacetic acid	ug/L	<5	5
Monobromoacetic acid	ug/L	3	1
Dichloroacetic acid	ug/L	19	0.5
Trichloroacetic acid	ug/L	20	1
Dibromoacetic acid	ug/L	1	0.5
Halo Acetic Acids 5, Total (calc.)	ug/L	43	5
Bromochloroacetic acid	ug/L	8	0.5

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Aug 01, 2012

## ***SRC ANALYTICAL***

422 Downey Road  
Saskatoon, Saskatchewan, Canada  
S7N 4N1  
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
2476 Victoria Avenue  
Box 1790  
Regina, SK S4P 3C8  
Attn: Dan Conrad

Date Samples Received: Jul-18-2012

Client P.O.: 17003

---

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Inorganics and Radiochemistry results have been authorized by Jeff Zimmer, Supervisor

SLOWPOKE-2 results have been authorized by Dave Chorney

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- \* US EPA
- \* CANMET

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\* Additional information is available upon request.

Aug 01, 2012

***SRC ANALYTICAL***

422 Downey Road  
 Saskatoon, Saskatchewan, Canada  
 S7N 4N1  
 (306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
 2476 Victoria Avenue  
 Box 1790  
 Regina, SK S4P 3C8  
 Attn: Dan Conrad

Sample #:	<b>2012025387</b>	Client PO #:	<b>17003</b>
Date Sampled:	<b>Jul 17, 2012</b>	Date Received:	<b>Jul 18, 2012</b>
Sample Matrix:	<b>WATER</b>		
Description:	<b>SK05JG0017 07/17/2012 07:42 BUFFALO POUND WATER TREATMENT PLANT - CLEARWELL</b>		

Analyte	Units	Result	DL
<b>Organic Chemistry</b>			
Monochloroacetic acid	ug/L	<5	5
Monobromoacetic acid	ug/L	<1	1
Dichloroacetic acid	ug/L	<0.5	0.5
Trichloroacetic acid	ug/L	<1	1
Dibromoacetic acid	ug/L	<0.5	0.5
Halo Acetic Acids 5, Total (calc.)	ug/L	<5	5
Bromochloroacetic acid	ug/L	<0.5	0.5

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Aug 01, 2012

## ***SRC ANALYTICAL***

422 Downey Road  
Saskatoon, Saskatchewan, Canada  
S7N 4N1  
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
2476 Victoria Avenue  
Box 1790  
Regina, SK S4P 3C8  
Attn: Dan Conrad

Date Samples Received: Jul-18-2012

Client P.O.: 17003

---

This is a final report.

Organics results have been authorized by Pat Moser, Supervisor

ICP results have been authorized by Keith Gipman, Supervisor

Inorganics and Radiochemistry results have been authorized by Jeff Zimmer, Supervisor

SLOWPOKE-2 results have been authorized by Dave Chorney

---

\* Test methods and data are validated by the laboratory's Quality Assurance Program.

\* Routine methods follow recognized procedures from sources such as

- \* Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
- \* Environment Canada
- \* US EPA
- \* CANMET

\* The results reported relate only to the test samples as provided by the client.

\* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

\* Additional information is available upon request.

Aug 01, 2012

***SRC ANALYTICAL***

422 Downey Road  
 Saskatoon, Saskatchewan, Canada  
 S7N 4N1  
 (306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
 2476 Victoria Avenue  
 Box 1790  
 Regina, SK S4P 3C8  
 Attn: Dan Conrad

Sample #: 2012025403  
 Date Sampled: Jul 07, 2012  
 Sample Matrix: WATER  
 Description: 07/07/2012 07:56 PRE GAC (CONVENTIONAL  
 TREATMENT)

Client PO #: 17003  
 Date Received: Jul 18, 2012

Analyte	Units	Result	DL
<b>Organic Chemistry</b>			
Monochloroacetic acid	ug/L	<5	5
Monobromoacetic acid	ug/L	4	1
Dichloroacetic acid	ug/L	7.5	0.5
Trichloroacetic acid	ug/L	16	1
Dibromoacetic acid	ug/L	1	0.5
Halo Acetic Acids 5, Total (calc.)	ug/L	29	5
Bromochloroacetic acid	ug/L	4	0.5

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Apr 05, 2012

**SRC ANALYTICAL**

422 Downey Road  
Saskatoon, Saskatchewan, Canada  
S7N 4N1  
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
2476 Victoria Avenue  
Box 1790  
Regina, SK S4P 3C8  
Attn: Dan Conrad

Date Samples Received: Mar-14-2012

Client P.O.: 17003

---

This is a final report.

Organics results have been authorized by Pat Moser, Supervisor

ICP results have been authorized by Keith Gipman, Supervisor

Inorganics and Radiochemistry results have been authorized by Jeff Zimmer, Supervisor

SLOWPOKE-2 results have been authorized by Dave Chorney

---

\* Test methods and data are validated by the laboratory's Quality Assurance Program.

\* Routine methods follow recognized procedures from sources such as

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- \* Environment Canada
- \* US EPA
- \* CANMET

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\* Additional information is available upon request.

Apr 05, 2012

***SRC ANALYTICAL***

422 Downey Road  
Saskatoon, Saskatchewan, Canada  
S7N 4N1  
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
2476 Victoria Avenue  
Box 1790  
Regina, SK S4P 3C8  
Attn: Dan Conrad

---

Sample #: 2012009650  
Date Sampled: Mar 13, 2012  
Sample Matrix: WATER  
Description: 03/13/2012 08:00 BPWTP RAW WATER

Client PO #: 17003  
Date Received: Mar 14, 2012

Analyte	Units	Result	DL
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**Organic Chemistry**

Carbaryl	ug/L	<0.1	0.1
Carbofuran	ug/L	<2	2

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Raw Lake Water  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0727 Samplers..ID1 :  
 EndDate: @ ..ID2 :  
 Raw DataFile : V0645

VOLATILE PRIORITY POLLUTANTS			
METHOD: DE505	TimeLines (days)	SCAN: VPP	from sample date
			Max Actual
Date Received : 7-Mar-12 by: JMP	-	1 --	
Date Extracted: 14-Mar-12 by: SS	7	8 *	
Date Analyzed : 14-Mar-12 by: SS	7	8 *	

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-
100651	1,1,1,2-Tetrachloroethane	0.0	.	.1	.1	95227	1,1,1-Trichloroethane	0.0	.	.1	.1
95224	1,1,2,2-Tetrachloroethane	0.0	.	.1	.1	95228	1,1,2-Trichloroethane	0.0	.	.1	.1
95214	1,1-Dichloroethane	0.0	.	.1	.1	95216	1,1-Dichloroethylene	0.0	.	.1	.1
100645	1,1-Dichloropropylene	0.0	.	.1	.1	100652	1,2,3-Trichlorobenzene	0.0	.	.1	.1
100655	1,2,3-Trichloroproppane	0.0	.	.1	.1	100653	1,2,4-Trichlorobenzene	0.0	.	.1	.1
100656	1,2,4-Trimethylbenzene	0.0	.	.1	.1	100640	1,2-Dibromo-3-chloropropane	0.0	.	.3	.1
100641	1,2-Dibromoethane	0.0	.	.1	.1	95211	1,2-Dichlorobenzene	0.0	.	.1	.1
95215	1,2-Dichloroethane	0.0	.	.1	.1	95218	1,2-Dichloropropane	0.0	.	.1	.1
100657	1,3,5-Trimethylbenzene	0.0	.	.1	.1	95212	1,3-Dichlorobenzene	0.0	.	.1	.1
100644	1,3-Dichloropropane	0.0	.	.1	.1	95213	1,4-Dichlorobenzene	0.0	.	.1	.1
100643	2,2-Dichloropropane	0.0	.	.1	.1	95207	2-Chloroethoxyethylene	0.0	.	.4	.1
100638	2-Chlorotoluene	0.0	.	.1	.1	100639	4-Chlorotoluene	0.0	.	.1	.1
95200	Benzene	0.0	.	.1	.1	100634	Bromobenzene	0.0	.	.1	.1
95201	Bromodichloromethane	0.0	.	.1	.1	95202	Bromoform	0.0	.	.5	.1
95203	Bromomethane	0.0	.	.1	.1	95204	Carbon tetrachloride	0.0	.	.1	.1
95205	Chlorobenzene	0.0	.	.1	.1	95206	Chloroethane	0.0	.	.1	.1
95208	Chloroform	0.0	.	.1	.1	106204	Chlormethane	0.0	.	.5	.1
95209	Dibromochloromethane	0.0	.	.1	.1	95210	Dibromomethane	0.0	.	.1	.1
95221	Ethyl benzene	0.0	.	.1	.1	100646	Hexachlorobutadiene	0.0	.	.3	.1
100647	Isopropylbenzene	0.0	.	.1	.1	102608	MTBE	0.0	.	.1	.1
95222	Methylene chloride	0.0	2.0	.	.1	100649	Naphthalene	0.0	.	.1	.1
95223	Styrene	0.0	.	.1	.1	100397	TRIBROMETHANES	0.0	.	.1	.1
95225	Tetrachloroethylene	0.0	.	.3	.1	95226	Toluene	0.0	.	.1	.1
100654	Trichloroethylene	0.0	.	.1	.1	95229	Trichlorofluoromethane	0.0	.	.1	.1
95232	Vinyl chloride	0.0	.	.5	.1	100407	XYLENES	0.0	.	.1	.1
100642	cis-1,2-Dichloroethylene	0.0	.	.1	.1	95219	cis-1,3-Dichloropropylene	0.0	.	.3	.1
95234	m,p-Xylene	0.0	.	.1	.1	100637	n-Butylbenzene	0.0	.	.1	.1
100650	n-Propylbenzene	0.0	.	.1	.1	95233	o-Xylene	0.0	.	.1	.1
100648	p-Isopropyltoluene	0.0	.	.1	.1	100635	sec-Butylbenzene	0.0	.	.1	.1
100636	tert-Butylbenzene	0.0	.	.1	.1	95217	trans-1,2-Dichloroethylene	0.0	.	.1	.1
95220	trans-1,3-Dichloropropylene	0.0	.	.3	.1						

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

flag B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybachuk	Team Leader	mail to: MWS Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 16-Mar-12	Bag 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, Sk S4P 3C8

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Raw Lake Water  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0727 Samplers..ID1 :  
 EndDate: @ ..ID2 :

VOLATILE PRIORITY POLLUTANTS		
METHOD: IES05	TimeLines (days)	
SCAN: VPP	from sample date	
	Max Actual	
Date Received : 7-Mar-12 by: JMP	- 1 --	
Date Extracted: 14-Mar-12 by: SS	7 8 *	
Date Analyzed : 14-Mar-12 by: SS	7 8 *	
Raw DataFile : V0645		

ESTIMATED  
CONCENTRATION

## TENTATIVELY IDENTIFIED COMPOUNDS // COMMENTS

No additional compounds reported

## Laboratory's comments regarding this sample:

The following items regarding the sample were recorded. A Yes notation indicates a problem with the specified item.

Inappropriate Sample Container -  
 Inappropriate Temperature -  
 Inappropriate Headspace -  
 Broken / Leaking Container -

This sample was analyzed by GC/MS. An additional GC/FID scan may have been used for screening purposes and to assist with quantitative data analysis.

Estimated concentrations for tentatively identified compounds are calculated assuming an equal response to internal standards.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

---

Certified For: Ryan Rybcuk	Team Leader	mail to: MWS Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 16-Mar-12	Bag 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, Sk S4P 3C8

---

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 2 of 2

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Raw Lake Water  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0727 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## EXTRACTABLE PRIORITY POLLUTANTS

METHOD: IIE340	TimeLines (days)
SCAN: EPP	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 12-Mar-12 by: drc	7 6 ok
Date Analyzed : 12-Mar-12 by: drc	21 6 ok
Raw DataFile :	E0646

VM_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-	VM_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-
100730	1,2,4-Trichlorobenzene	0.0	.	.1	.1	100734	1,2-Diphenylhydrazine	0.0	.	.1	.1
103632	2,3,4,6-Tetrachlorophenol	0.0	.	.1	.2	100708	2,4,6-Trichlorophenol	0.0	.	.1	.2
100700	2,4-Dichlorophenol	0.0	.	.1	.2	100701	2,4-Dimethylphenol	0.0	.	.2	.2
100703	2,4-Dinitrophenol	0.0	.	.1	.2	100732	2,4-Dinitrotoluene	0.0	.	.1	.1
100733	2,6-Dinitrotoluene	0.0	.	.1	.1	100725	2-Chloronaphthalene	0.0	.	.1	.1
100699	2-Chlorophenol	0.0	.	.2	.2	100702	2-Methyl-4,6-dinitrophenol	0.0	.	.1	.2
100704	2-Nitrophenol	0.0	.	.1	.2	100738	4-Bromophenyl phenyl ether	0.0	.	.1	.1
100698	4-Chloro-3-methylphenol	0.0	.	.1	.2	100742	4-Chlorophenyl phenyl ether	0.0	.	.1	.1
100705	4-Nitrophenol	0.0	.	.1	.2	100709	Acenaphthene	0.0	.	.1	.1
100710	Acenaphthylene	0.0	.	.1	.1	100711	Anthracene	0.0	.	.1	.1
100731	Benzidine	0.0	.	.2	.2	100712	Benzo(a)anthracene	0.0	.	.1	.1
100716	Benzo(a)pyrene	0.0	.	.1	.2	100713	Benzo(b)fluoranthene	0.0	.	.1	.1
100715	Benzo(ghi)perylene	0.0	.	.2	.1	100714	Benzo(k)fluoranthene	0.0	.	.1	.1
100739	Bis(2-chloroethoxy)methane	0.0	.	.1	.1	100740	Bis(2-chloroethyl)ether	0.0	.	.1	.1
100741	Bis(2-chloroisopropyl)ether	0.0	.	.1	.1	100748	Bis(2-ethylhexyl)phthalate	0.0	.	.1	.1
100743	Butylbenzylphthalate	0.0	.	.1	.1	100717	Chrysene	0.0	.	.1	.1
100744	Di-n-butylphthalate	0.0	.	.1	.1	100747	Di-n-octyl phthalate	0.0	.	.1	.1
100718	Dibenzo(ah)anthracene	0.0	.	.5	.1	100745	Diethyl phthalate	0.0	.	.1	.1
100746	Dimethyl phthalate	0.0	.	.1	.1	100719	Fluoranthene	0.0	.	.1	.1
100720	Fluorene	0.0	.	.1	.1	100726	Hexachlorobenzene	0.0	.	.1	.1
100727	Hexachlorobutadiene	0.0	.	.5	.1	100728	Hexachlorocyclopentadiene	0.0	.	.1	.1
100729	Hexachloroethane	0.0	.	.5	.1	100721	Indeno(1,2,3-cd)pyrene	0.0	.	.1	.1
100749	Isophorone	0.0	.	.1	.1	100737	N-Nitroso-di-n-propylamine	0.0	.	.2	.1
100736	N-Nitrosodiphenylamine	0.0	.	.1	.1	100722	Naphthalene	0.0	.	.1	.1
100735	Nitrobenzene	0.0	.	.1	.1	100706	Pentachlorophenol	0.0	.	.1	.2
100723	Phenanthrene	0.0	.	.1	.1	100707	Phenol	0.0	.	.1	.2
100724	Pyrene	0.0	.	.1	.1						

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

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\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybachuk	Team Leader	mail to: MWS Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 13-Mar-12	Bag 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, Sk
		SAP 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 2

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Raw Lake Water  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0727 Samplers..ID1 :  
 EndDate: @ ..ID2 :

EXTRACTABLE PRIORITY POLLUTANTS		
METHOD: IK340	TimeLines (days)	
SCAN: EPP	from sample date	
	Max Actual	
Date Received : 7-Mar-12 by: JMP	-	1 --
Date Extracted: 12-Mar-12 by: drc	7	6 ok
Date Analyzed : 12-Mar-12 by: drc	21	6 ok
Raw DataFile :	E0646	

ESTIMATED  
CONCENTRATION

## TENTATIVELY IDENTIFIED COMPOUNDS // COMMENTS

No additional compounds reported

## Laboratory's comments regarding this sample:

The following items regarding the sample were recorded. A Yes notation indicates a problem with the specified item.

- Inappropriate Sample Container -
- Inappropriate Temperature -
- Inappropriate Headspace -
- Broken / Leaking Container -

This sample was analyzed by GC/MS. An additional GC/FID scan may have been used for screening purposes and to assist with quantitative data analysis.

Estimated concentrations for tentatively identified compounds are calculated assuming an equal response to internal standards.

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Certified For: Ryan Rybchuk	Team Leader	mail to: MWS Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 13-Mar-12	Bag 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, Sk
		S4P 3C8

---

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Raw Lake Water  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0727 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## Pesticide Analysis

METHOD: EM443	Timeline (days)
SCAN: PRSTE	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 23-Mar-12 by: KLS	10 17 *
Date Analyzed : 27-Mar-12 by: KLS	20 21 *
Raw DataFile : p0647	

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-
100667	2,4-D	.017	H	.005	.002	100668	2,4-DB	0.000		.005	.002
100669	2,4-DP	0.000		.005	.002	99888	2,4-dichlorophenol	0.000		.010	.004
99887	4-chloro-2-methylphenol	0.000		.010	.004	97938	Aldicarb	0.000		.100	.020
102929	Aldrin	0.000		.005	.002	106769	Aminopyralid	0.000		.010	.003
100674	Atrazine	0.000		.005	.002	99897	Bentazon	0.000		.005	.002
100675	Bromacil	0.000		.030	.004	100676	Bromoxynil	0.000		.005	.002
100677	Carbathiin (Carboxin)	0.000		.100	.020	99889	Chlorothalonil	0.000		.005	.002
100684	Chlorpyrifos (Dursban)	0.000		.005	.002	99881	Clodinafop acid metabolite	0.000		.020	.004
99880	Clodinafop-propargyl	0.000		.040	.056	100688	Clopyralid (Lontrel)	0.000		.020	.004
100678	Cyanazine	0.000		.050	.008	102609	Desethyl atrazine	0.000		.050	.008
102610	Desisopropyl atrazine	0.000		.050	.008	100679	Diazinon	0.000		.005	.002
103639	Dicamba (Banvel)	0.000		.005	.002	100681	Diclofop-methyl (Hoe Grass)	0.000		.020	.004
102930	Dieldrin	0.000		.005	.002	102618	Dimethoate (Cygon)	0.000		.050	.007
100682	Disulfoton (Di-Syston)	0.000		.200	.050	100683	Diuron	0.000		.200	.250
100685	Ethalflurralin (Edge)	0.000		.005	.002	100686	Ethion	0.000		.100	.020
99898	Ethofumesate	0.000		.005	.002	102613	Fencoprop-P-ethyl	0.000		.040	.008
99894	Fluazifop	0.000		.010	.004	99895	Fluoroxypyrr	0.000		.010	.004
100687	Guthion	0.000		.200	.020	99892	Hexaconazole	0.000		.050	.008
102088	Imazamethabenz-methyl (Assert)	0.000		.050	.044	103141	Imazamox	0.000		.020	.002
102612	Imazethapyr	0.000		.020	.004	99890	Iprodione	0.000		.020	.004
99899	Linuron	0.000		.020	.004	100690	MCPA	0.000		.005	.002
100691	MCPPB	0.000		.020	.004	100692	MCPP (Mecoprop)	0.000		.005	.002
100689	Malathion	0.000		.050	.008	99893	Metalexyl-M	0.000		.010	.004
97934	Methomyl	0.000		.100	.020	102935	Metolachlor	0.000		.005	.002
103631	Metribuzin	0.000		.010	.004	74365	Napropamide	0.000		.020	.004
97933	Oxycarboxin	0.000		.050	.008	103630	Parathion	0.000		.010	.004
100694	Phorate (Thimet)	0.000		.005	.002	100693	Picloram (Tordon)	0.000		.005	.002

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

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X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

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Certified For: Ryan Rybchuk	Team Leader	mail to: MWS Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 30-Mar-12	Box 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, SK
		S4P 3C8

\*results relate only to the item tested\*

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page 1 of 1

PESTICIDE ANALYSIS					
Contact: MWS Buffalo Pound Water Treatment Plant	METHOD: EM443	TimeLines (days)			
SmpNo : ProjNo : GrpSmpNo :	SCAN: PESTR	from sample date			
StaNo : SK05JG0017 StaType:		Max Actual			
Comment: Raw Lake Water	Date Received : 7-Mar-12 by: JMP	-	1		
Matrix : 9	Date Extracted: 23-Mar-12 by: KLS	10	17 *		
SmpDate: 6-Mar-12 @ 0727 Samplers..ID1 :	Date Analyzed : 27-Mar-12 by: KLS	20	21 *		
EndDate: @ ..ID2 :	Raw DataFile : p0647				

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-
99891	Propiconazole	0.000	.	.050	.008	102614	Pyridaben	0.000	.	.020	.004
102611	Quinclorac	0.000	.	.005	.002	99896	Quizalofop	0.000	.	.030	.004
103824	Simazine	0.000	.	.010	.004	100695	Terbufos	0.000	.	.030	.004
74474	Thiamethoxam	0.000	.	.050	.008	100696	Triallate (Avadex EW)	0.000	.	.005	.002
103825	Triclopyr	0.000	.	.010	.004	100697	Trifluralin (Treflan)	0.000	.	.005	.002
97932	Vinclozolin	0.000	.	.010	.004	100670	alpha-BHC	0.000	.	.005	.002
100671	alpha-Endosulfan	0.000	.	.005	.002	100672	gamma-BHC (Lindane)	0.000	.	.005	.002
100673	p,p-Methoxychlor	0.000	.	.030	.004						

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limit.

M - This value is calculated by an alternate Raw DataFile.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk	Team Leader	mail to: MWS Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 30-Mar-12	Bag 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 1

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StkNo : SK05JG0017 StkType:  
 Comment: Raw Lake Water  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0727 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## POLYCYCLIC AROMATIC HYDROCARBONS

METHOD: - - -	TimeLines (days)
SCAN: PAH	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 8-Mar-12 by: rnr	11 2 ok
Date Analyzed : 15-Mar-12 by: rnr	21 9 ok
Raw DataFile : P0648	

VM_CODE	COMPOUND NAME	ug/L	MDL	VM_CODE	COMPOUND NAME	ug/L	MDL
		flag				flag	

## GC/MSD SIM DATA

107977 1-Methylnaphthalene	0.00	.01	107978 2-Methylnaphthalene	0.00	.01
103142 3-Methylchloranthrene	0.00	.01	103143 7,12-Dimethylbenz(a)anthracen	0.00	.01
103144 Acenaphthene	0.00	.01	103145 Acenaphthylene	0.00	.01
103146 Acridine	0.00	.01	103147 Anthracene	0.00	.01
103148 Benzo(a)anthracene	0.00	.01	103149 Benzo(a)pyrene	0.00	.01
103150 Benzo(b,j,k)fluoranthene	0.00	.01	103151 Benzo(c)phenanthrene	0.00	.01
103152 Benzo(e)pyrene	0.00	.01	103153 Benzo(ghi)perylene	0.00	.01
103154 Chrysene	0.00	.01	103155 Dibenzo(a,h)pyrene	0.00	.01
103156 Dibenzo(a,i)pyrene	0.00	.01	103157 Dibenzo(a,l)pyrene	0.00	.01
103158 Dibenzo(ah)anthracene	0.00	.01	103159 Fluoranthene	0.00	.01
103160 Fluorene	0.00	.01	103161 Indeno(1,2,3-cd)pyrene	0.00	.01
103162 Naphthalene	0.00	.01	107132 Perylene	0.00	.01
103163 Phenanthrene	0.00	.01	103164 Pyrene	0.00	.01
103761 Retene	0.00	.01			

## ARC Remarks:

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

flag: B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybachuk	Team Leader	mail to: MWS Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 22-Mar-12	Bag 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, SK
		S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 1

Contact: MWS Buffalo Pound Water Treatment Plant  
 SampNo : ProjNo : GrpSampNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Raw Lake Water  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0727 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## GLYPHOSATE, AMPA AND GLUFOSINATE

METHOD: EC/16	TimeLines (days)
SCAN: GLYPH	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 12-Apr-12 by: KLS	10 37 *
Date Analyzed : 13-Apr-12 by: KLS	60 38 ok
Raw DataFile : g0649	

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-
103453	Aminomethyl Phosphonic Acid	0.000		1.000		103626	Glufosinate	0.000		1.000	
103452	Glyphosate	0.000		.200							

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

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X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

---

Certified For: Ryan Rybczuk Team Leader mail to: MWS Buffalo Pound Water Treatment Plant  
 Organic Environmental Monitoring attn: Dan Conrad  
 Alberta Innovates - Technology Futures  
 Date: 16-Apr-12 Bag 4000, Vegreville, Alberta Box 1790  
 Contact No. (780) 632-8455 T9C 1T4 Regina, Sk S4P 3C8

---

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required. page 1 of 1

			Neutral Drug Residues		
Contact:	MWS Buffalo Pound Water Treatment Plant	ProjNo :	GrpSmpNo :	METHOD: 1983	Timeline (days)
SmpNo :		StaNo :	SK05JG0017 StaType:	SCAN: DRUGN	from sample date
Comment:	Raw Lake Water				Max Actual
Matrix :	9			Date Received : 7-Mar-12 by: JMP	- 1 --
SmpDate:	6-Mar-12 @ 0727	Samplers..ID1 :		Date Extracted: 22-Mar-12 by: Kls	10 16 *
EndDate:	@	..ID2 :		Date Analyzed : 3-Apr-12 by: Kls	50 28 ok
				Raw DataFile :	D0650

VMV_CODE	COMPOUND NAME	ppb	flag MOL +/-	VMV_CODE	COMPOUND NAME	ppb	flag MOL +/-
80271	Acetaminophen	0.000	.05	106163	Benzoyllecgonine	0.000	.01
80293	Chloramphenicol	0.000	.01	80283	Ciprofloxacin	0.000	.02
80294	Clindamycin	0.000	.01	107667	Cocaine	0.000	.01
106272	Codeine	0.000	.05	80280	Cotinine	0.000	.01
80284	Eurofloxacin	0.000	.02	80295	Erythromycin	0.000	.01
80285	Fluoxetine	0.000	.01	80270	Lincomycin	0.000	.05
80282	Methamphetamine	0.000	.02	80286	Norflloxacin	.061 H	.02
80287	Norfluoxetine	0.000	.02	80288	Ofloxacin	0.000	.02
80289	Oxolinic Acid	0.000	.01	80290	Pentoxifylline	0.000	.50
80291	Pipemidic Acid	0.000	.50	107265	Sulfabenzamide	0.000	.05
107266	Sulfadimethoxine	0.000	.05	107267	Sulfadiazine	0.000	.05
107268	Sulfamerazine	0.000	.05	106270	Sulfamethazine	0.000	.05
106271	Sulfamethoxazole	0.000	.05	107269	Sulfapyridine	0.000	.05
107270	Sulfaquinoxaline	0.000	.05	107271	Sulfathiazole	0.000	.05
80292	Trimethoprim	0.000	.02				

Zero (0) values indicate that the analyte is not DETECTED.

MOL - Method Detection Limit

flags: B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MOL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk	Team Leader	mail to: MWS Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 4-Apr-12	BAG 4000, VEGREVILLE, ALBERTA	Box 1790
Contact No. (780) 632-8455	TSC 1T4	Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 1

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmplNo : ProjNo : GrpSmplNo :  
 Statio : SK05JG0017 StaType:  
 Comment: Raw Lake Water  
 Matrix : 9  
 SmplDate: 6-Mar-12 @ 0727 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## Artificial Sweeteners in Water

METHOD:	TimeLines (days)
SCAN: ASWERT	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 23-Mar-12 by: kls	14 17 *
Date Analyzed : 26-Mar-12 by: kls	30 20 ok
Raw DataFile :	A0651

VMV_CODE	COMPOUND NAME	ppb	flag MDL +/-	VMV_CODE	COMPOUND NAME	ppb	flag MDL +/-
108028	Acesulfame	0.000	.50	108030	Aspartame	0.000	.50
108026	Cyclamate	0.000	.50	108031	Neotame	0.000	.10
108029	Saccharin	0.000	.50	108027	Sucralose	0.000	2.00

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybachuk Team Leader mail to: MWS Buffalo Pound Water Treatment Plant  
 Organic Environmental Monitoring attn: Dan Conrad  
 Alberta Innovates - Technology Futures  
 Date: 28-Mar-12 BAG 4000, VEGREVILLE, ALBERTA Box 1790  
 Contact No. (780) 632-8455 T9C 1T4 Regina, SK S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 1

Contact: MME Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StafNo : SK05JG0017 StaffType:  
 Comment: Clearwell  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0839 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## VOLATILE PRIORITY POLLUTANTS

METHOD: IR505	TimeLines (days)
SCAN: VPP	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 14-Mar-12 by: SS	7 8 *
Date Analyzed : 14-Mar-12 by: SS	7 8 *
Raw DataFile :	V0652

VMN CODE	COMPOUND NAME	ug/L	flag	MDL	+/-	VMN CODE	COMPOUND NAME	ug/L	flag	MDL	+/-
100651	1,1,1,2-Tetrachloroethane	0.0	.	.1	.1	95227	1,1,1-Trichloroethane	0.0	.	.1	.1
95224	1,1,2,2-Tetrachloroethane	0.0	.	.1	.1	95228	1,1,2-Trichloroethane	0.0	.	.1	.1
95214	1,1-Dichloroethane	0.0	.	.1	.1	95216	1,1-Dichloroethylene	0.0	.	.1	.1
100645	1,1-Dichloropropylene	0.0	.	.1	.1	100652	1,2,3-Trichlorobenzene	0.0	.	.1	.1
100655	1,2,3-Trichloropropane	0.0	.	.1	.1	100653	1,2,4-Trichlorobenzene	0.0	.	.1	.1
100656	1,2,4-Trimethylbenzene	0.0	.	.1	.1	100640	1,2-Dibromo-3-chloropropane	0.0	.	.3	.1
100641	1,2-Dibromoethane	0.0	.	.1	.1	95211	1,2-Dichlorobenzene	0.0	.	.1	.1
95215	1,2-Dichloroethane	0.0	.	.1	.1	95218	1,2-Dichloropropane	0.0	.	.1	.1
100657	1,3,5-Trimethylbenzene	0.0	.	.1	.1	95212	1,3-Dichlorobenzene	0.0	.	.1	.1
100644	1,3-Dichloropropene	0.0	.	.1	.1	95213	1,4-Dichlorobenzene	0.0	.	.1	.1
100643	2,2-Dichloropropane	0.0	.	.1	.1	95207	2-Chloroethoxyethylene	0.0	.	.4	.1
100638	2-Chlorotoluene	0.0	.	.1	.1	100639	4-Chlorotoluene	0.0	.	.1	.1
95200	Benzene	0.0	.	.1	.1	100634	Bromobenzene	0.0	.	.1	.1
95201	Bromodichloromethane	14.3	H	.1	.4	95202	Bromoform	0.0	.	.5	.1
95203	Bromomethane	0.0	.	.1	.1	95204	Carbon tetrachloride	0.0	.	.1	.1
95205	Chlorobenzene	0.0	.	.1	.1	95206	Chloroethane	0.0	.	.1	.1
95208	Chloroform	34.9	H	.1	.4	106204	Chloromethane	0.0	.	.5	.1
95209	Dibromochloromethane	8.6	H	.1	.4	95210	Dibromomethane	0.0	.	.1	.1
95221	Ethyl benzene	0.0	.	.1	.1	100646	Hexachlorobutadiene	0.0	.	.3	.1
100647	Isopropylbenzene	0.0	.	.1	.1	102608	MIBK	0.0	.	.1	.1
95222	Methylene chloride	0.0	.	2.0	.1	100649	Naphthalene	0.0	.	.1	.1
95223	Styrene	0.0	.	.1	.1	100397	TRIHALOMETHANES	57.8	H	.1	2.0
95225	Tetrachloroethylene	0.0	.	.3	.1	95226	Toluene	0.0	.	.1	.1
100654	Trichloroethylene	0.0	.	.1	.1	95229	Trichlorofluoromethane	0.0	.	.1	.1
95232	Vinyl chloride	0.0	.	.5	.1	100407	XYLARES	0.0	.	.1	.1
100642	cis-1,2-Dichloroethylene	0.0	.	.1	.1	95219	cis-1,3-Dichloropropylene	0.0	.	.3	.1
95234	m,p-Xylene	0.0	.	.1	.1	100637	n-Butylbenzene	0.0	.	.1	.1
100650	n-Propylbenzene	0.0	.	.1	.1	95233	o-Xylene	0.0	.	.1	.1
100648	p-Isopropyltoluene	0.0	.	.1	.1	100635	sec-Butylbenzene	0.0	.	.1	.1
100636	tert-Butylbenzene	0.0	.	.1	.1	95217	trans-1,2-Dichloroethylene	0.0	.	.1	.1
95220	trans-1,3-Dichloropropylene	0.0	.	.3	.1						

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

flag: B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybcuk Team Leader mail to: MME Buffalo Pound Water Treatment Plant  
 Organic Environmental Monitoring attn: Dan Conrad  
 Alberta Innovates - Technology Futures  
 Date: 16-Mar-12 Reg 4000, Vegreville, Alberta Box 1790  
 Contact No. (780) 632-8455 T9C 1T4 Regina, Sk S4P 3C8

Contact: MME Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Clearwell  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0839 Samplers..ID1 :  
 EndDate: @ ..ID2 :

VOLATILE PRIORITY POLLUTANTS		TimeLines (days)
METHOD: IRS05	SCAN: VPP	from sample date
		Max Actual
Date Received : 7-Mar-12 by: JMP	-	1 --
Date Extracted: 14-Mar-12 by: SS	7	8 *
Date Analyzed : 14-Mar-12 by: SS	7	8 *
Raw DataFile :	V0652	

ESTIMATED  
CONCENTRATION

## TENTATIVELY IDENTIFIED COMPOUNDS // COMMENTS

No additional compounds reported

## Laboratory's comments regarding this sample:

The following items regarding the sample were recorded. A Yes notation indicates a problem with the specified item.

Inappropriate Sample Container -  
 Inappropriate Temperature -  
 Inappropriate Headspace -  
 Broken / Leaking Container -

This sample was analyzed by GC/ME. An additional GC/FID scan may have been used for screening purposes and to assist with quantitative data analysis.

Estimated concentrations for tentatively identified compounds are calculated assuming an equal response to internal standards.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

---

Certified For: Ryan Rybachuk Team Leader mail to: MME Buffalo Pound Water Treatment Plant  
 Organic Environmental Monitoring attn: Dan Conrad  
 Alberta Innovates - Technology Futures  
 Date: 16-Mar-12 Bag 4000, Vegreville, Alberta Box 1790  
 Contact No. (780) 632-8455 T9C 1T4 Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

Contact: MME Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Clearwell  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0839 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## EXTRACTABLE PRIORITY POLLUTANTS

METHOD: IR340	TimeLines (days)
SCAN: EPP	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 12-Mar-12 by: drc	7 6 ok
Date Analyzed : 12-Mar-12 by: drc	21 6 ok
Raw DataFile :	E0653

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-
100730	1,2,4-Trichlorobenzene	0.0	.	.1	.1	100734	1,2-Diphenylhydrazine	0.0	.	.1	.1
103632	2,3,4,6-Tetrachlorophenol	0.0	.	.1	.2	100708	2,4,6-Trichlorophenol	0.0	.	.1	.2
100700	2,4-Dichlorophenol	0.0	.	.1	.2	100701	2,4-Dimethylphenol	0.0	.	.2	.2
100703	2,4-Dinitrophenol	0.0	.	.1	.2	100732	2,4-Dinitrotoluene	0.0	.	.1	.1
100733	2,6-Dinitrotoluene	0.0	.	.1	.1	100725	2-Chloronaphthalene	0.0	.	.1	.1
100699	2-Chlorophenol	0.0	.	.2	.2	100702	2-Methyl-4,6-dinitrophenol	0.0	.	.1	.2
100704	2-Nitrophenol	0.0	.	.1	.2	100738	4-Bromophenyl phenyl ether	0.0	.	.1	.1
100698	4-Chloro-3-methylphenol	0.0	.	.1	.2	100742	4-Chlorophenyl phenyl ether	0.0	.	.1	.1
100705	4-Nitrophenol	0.0	.	.1	.2	100709	Acenaphthene	0.0	.	.1	.1
100710	Acenaphthylene	0.0	.	.1	.1	100711	Anthracene	0.0	.	.1	.1
100731	Benzidine	0.0	.	.2	.2	100712	Benzo(a)anthracene	0.0	.	.1	.1
100716	Benzo(a)pyrene	0.0	.	.1	.2	100713	Benzo(b)fluoranthene	0.0	.	.1	.1
100715	Benzo(ghi)perylene	0.0	.	.2	.1	100714	Benzo(k)fluoranthene	0.0	.	.1	.1
100739	Bis(2-chloroethoxy)methane	0.0	.	.1	.1	100740	Bis(2-chloroethyl)ether	0.0	.	.1	.1
100741	Bis(2-chloroisopropyl)ether	0.0	.	.1	.1	100748	Bis(2-ethylhexyl)phthalate	0.0	.	.1	.1
100743	Butylbenzylphthalate	0.0	.	.1	.1	100717	Chrysene	0.0	.	.1	.1
100744	Di-n-butylphthalate	0.0	.	.1	.1	100747	Di-n-octyl phthalate	0.0	.	.1	.1
100718	Dibenzo(ah)anthracene	0.0	.	.5	.1	100745	Diethyl phthalate	0.0	.	.1	.1
100746	Dimethyl phthalate	0.0	.	.1	.1	100719	Fluoranthene	0.0	.	.1	.1
100720	Fluorene	0.0	.	.1	.1	100726	Hexachlorobenzene	0.0	.	.1	.1
100727	Hexachlorobutadiene	0.0	.	.5	.1	100728	Hexachlorocyclopentadiene	0.0	.	.1	.1
100729	Hexachloroethane	0.0	.	.5	.1	100721	Indeno(1,2,3-cd)pyrene	0.0	.	.1	.1
100749	Isophorone	0.0	.	.1	.1	100737	N-Nitroso-di-n-propylamine	0.0	.	.2	.1
100736	N-Nitrosodiphenylamine	0.0	.	.1	.1	100722	Naphthalene	0.0	.	.1	.1
100735	Nitrobenzene	0.0	.	.1	.1	100706	Pentachlorophenol	0.0	.	.1	.2
100723	Phenanthrene	0.0	.	.1	.1	100707	Phenol	0.0	.	.1	.2
100724	Pyrene	0.0	.	.1	.1						

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

\* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk	Team Leader	mail to: MME Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 13-Mar-12	Bag 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 2

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Clearwell  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0839 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## EXTRACTABLE PRIORITY POLLUTANTS

METHOD: IE340	TimeLines (days)
SCAN: EPP	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 12-Mar-12 by: drc	7 6 ok
Date Analyzed : 12-Mar-12 by: drc	21 6 ok
Raw DataFile :	R0653

ESTIMATED  
CONCENTRATION

## TENTATIVELY IDENTIFIED COMPOUNDS // COMMENTS

No additional compounds reported

## Laboratory's comments regarding this sample:

The following items regarding the sample were recorded. A Yes notation indicates a problem with the specified item.

Inappropriate Sample Container -  
 Inappropriate Temperature -  
 Inappropriate Headspace -  
 Broken / Leaking Container -

This sample was analyzed by GC/MS. An additional GC/FID scan may have been used for screening purposes and to assist with quantitative data analysis.

Estimated concentrations for tentatively identified compounds are calculated assuming an equal response to internal standards.

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\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk Team Leader mail to: MWS Buffalo Pound Water Treatment Plant  
 Organic Environmental Monitoring attn: Dan Conrad  
 Alberta Innovates - Technology Futures  
 Date: 13-Mar-12 Bag 4000, Vegreville, Alberta Box 1790  
 Contact No. (780) 632-8455 T9C 1T4 Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Clearwell  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0839 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## PESTICIDE ANALYSIS

METHOD: EM443	TimeLines (days)
SCAN: PESTE	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 23-Mar-12 by: KLS	10 17 *
Date Analyzed : 27-Mar-12 by: KLS	20 21 *
Raw DataFile : p0654	

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-
100667	2,4-D	.016	H	.005	.002	100668	2,4-DB	0.000		.005	.002
100669	2,4-DP	0.000		.005	.002	99888	2,4-dichlorophenol	0.000		.010	.004
99887	4-chloro-2-methylphenol	0.000		.010	.004	97938	Aldicarb	0.000		.100	.020
102929	Aldrin	0.000		.005	.002	106769	Aminopyralid	0.000		.010	.003
100674	Atrazine	0.000		.005	.002	99897	Bentazon	0.000		.005	.002
100675	Bromacil	0.000		.030	.004	100676	Bromoxynil	0.000		.005	.002
100677	Carbathiin (Carboixin)	0.000		.100	.020	99889	Chlorothalonil	0.000		.005	.002
100684	Chlorpyrifos (Dursban)	0.000		.005	.002	99881	Clodinafop acid metabolite	0.000		.020	.004
99880	Clodinafop-propargyl	0.000		.040	.056	100688	Clopyralid (Lontrel)	0.000		.020	.004
100678	Cyanazine	0.000		.050	.008	102609	Desethyl atrazine	0.000		.050	.008
102610	Desisopropyl atrazine	0.000		.050	.008	100679	Diazinon	0.000		.005	.002
103639	Dicamba (Banvel)	0.000		.005	.002	100681	Diclofop-methyl (Hoe Grass)	0.000		.020	.004
102930	Dieldrin	0.000		.005	.002	102618	Dimethoate (Cygon)	0.000		.050	.007
100682	Disulfoton (Di-Syston)	0.000		.200	.050	100683	Diuron	0.000		.200	.250
100685	Ethalfluralin (Edge)	0.000		.005	.002	100686	Ethion	0.000		.100	.020
99898	Ethofumesate	0.000		.005	.002	102613	Fenoxaprop-P-ethyl	0.000		.040	.008
99894	Fluazifop	0.000		.010	.004	99895	Fluoxypyr	0.000		.010	.004
100687	Guthion	0.000		.200	.020	99892	Hexaconazole	0.000		.050	.008
102088	Imazamethabenz-methyl (Assert)	0.000		.050	.044	103141	Imazamox	0.000		.020	.002
102612	Imazethapyr	0.000		.020	.004	99890	Iprodione	0.000		.020	.004
99899	Limuron	0.000		.020	.004	100690	MCPA	0.000		.005	.002
100691	MCPB	0.000		.020	.004	100692	MCPP (Mecoprop)	0.000		.005	.002
100689	Malathion	0.000		.050	.008	99893	Metalaxyll-M	0.000		.010	.004
97934	Methomyl	0.000		.100	.020	102935	Metolachlor	0.000		.005	.002
103631	Metribuzin	0.000		.010	.004	74365	Napropamide	0.000		.020	.004
97933	Oxycarboxin	0.000		.050	.008	103630	Parathion	0.000		.010	.004
100694	Phorate (Thimet)	0.000		.005	.002	100693	Picloram (Tordon)	0.000		.005	.002

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

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\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk Team Leader mail to: MWS Buffalo Pound Water Treatment Plant  
 Organic Environmental Monitoring attn: Dan Conrad  
 Alberta Innovates - Technology Futures  
 Date: 30-Mar-12 Bag 4000, Vegreville, Alberta Box 1790  
 Contact No. (780) 632-8455 T9C 1T4 Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 1

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Clearwell  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0839 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## PESTICIDE ANALYSIS

METHOD: EM443	TimeLines (days)
SCAN: PESTE	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1
Date Extracted: 23-Mar-12 by: KLS	10 17 *
Date Analyzed : 27-Mar-12 by: KLS	20 21 *
Raw DataFile :	p0654

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+/-
99891	Propiconazole	0.000	.	.050	.008	102614	Pyridaben	0.000	.	.020	.004
102611	Quinclorac	0.000	.	.005	.002	99896	Quizalofop	0.000	.	.030	.004
103824	Simazine	0.000	.	.010	.004	100695	Turbufos	0.000	.	.030	.004
74474	Thiamethoxam	0.000	.	.050	.008	100696	Triallate (Avadex EW)	0.000	.	.005	.002
103825	Triclopyr	0.000	.	.010	.004	100697	Trifluralin (Treflan)	0.000	.	.005	.002
97932	Vinclozolin	0.000	.	.010	.004	100670	alpha-BHC	0.000	.	.005	.002
100671	alpha-Endosulfan	0.000	.	.005	.002	100672	gamma-BHC (Lindane)	0.000	.	.005	.002
100673	p,p'-Methoxychlor	0.000	.	.030	.004						

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Certified For: Ryan Rybchuk Team Leader mail to: MWS Buffalo Pound Water Treatment Plant  
 Organic Environmental Monitoring attn: Dan Conrad  
 Alberta Innovates - Technology Futures  
 Date: 30-Mar-12 Bag 4000, Vegreville, Alberta Box 1790  
 Contact No. (780) 632-8455 T9C 1T4 Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 1

Contact: MWNs Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Clearwell  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0839 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## POLYCYCLIC AROMATIC HYDROCARBONS

METHOD: - - -	TimeLines (days)
SCAN: PAH	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 8-Mar-12 by: rnr	11 2 ok
Date Analyzed : 15-Mar-12 by: rnr	21 9 ok
Raw DataFile : P0655.DUP	

VMV_CODE	COMPOUND NAME	ug/L	MDL	VMV_CODE	COMPOUND NAME	ug/L	MDL
			flag				flag

## GC/MSD SIM DATA

107977 1-Methylnaphthalene	0.00	.01	107978 2-Methylnaphthalene	0.00	.01
103142 3-Methylchloranthrene	0.00	.01	103143 7,12-Dimethylbenz(a)anthracen	0.00	.01
103144 Acenaphthene	0.00	.01	103145 Acenaphthylene	0.00	.01
103146 Acridine	0.00	.01	103147 Anthracene	0.00	.01
103148 Benzo(a)anthracene	0.00	.01	103149 Benzo(a)pyrene	0.00	.01
103150 Benzo(b,j,k)fluoranthene	0.00	.01	103151 Benzo(c)phenanthrene	0.00	.01
103152 Benzo(e)pyrene	0.00	.01	103153 Benzo(ghi)perylene	0.00	.01
103154 Chrysene	0.00	.01	103155 Dibenz(a,h)pyrene	0.00	.01
103156 Dibenz(a,i)pyrene	0.00	.01	103157 Dibenz(a,l)pyrene	0.00	.01
103158 Dibenz(a,h)anthracene	0.00	.01	103159 Fluoranthene	0.00	.01
103160 Fluorene	0.00	.01	103161 Indeno(1,2,3-cd)pyrene	0.00	.01
103162 Naphthalene	0.00	.01	107132 Perylene	0.00	.01
103163 Phenanthrene	0.00	.01	103164 Pyrene	0.00	.01
103761 Retene	0.00	.01			

## ARC Remarks:

Zero (0) values indicate that the analyte is not DETECTED.

MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

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\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk	Team Leader	mail to: MWNs Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 22-Mar-12	Bag 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 1

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StaNo : SK05JG0017 StaType:  
 Comment: Clearwell  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0839 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## POLYCYCLIC AROMATIC HYDROCARBONS

METHOD:	TimeLines (days)
SCAN: PAH	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1
Date Extracted: 8-Mar-12 by: rnr	11 2 ok
Date Analyzed : 16-Mar-12 by: rnr	21 10 ok
Raw DataFile :	Z0655 DUP

VMV_CODE	COMPOUND NAME	ug/L	MOL	VMV_CODE	COMPOUND NAME	ug/L	MOL
			flag				flag

## GC/MSD SIM DATA

107977 1-Methylnaphthalene	0.00	.01	107978 2-Methylnaphthalene	0.00	.01
103142 3-Methylchloranthrene	0.00	.01	103143 7,12-Dimethylbenz(a)anthracen	0.00	.01
103144 Acenaphthene	0.00	.01	103145 Acenaphthylene	0.00	.01
103146 Acridine	0.00	.01	103147 Anthracene	0.00	.01
103148 Benzo(a)anthracene	0.00	.01	103149 Benzo(a)pyrene	0.00	.01
103150 Benzo(b,j,k)fluoranthene	0.00	.01	103151 Benzo(c)phenanthrene	0.00	.01
103152 Benzo(e)pyrene	0.00	.01	103153 Benzo(ghi)perylene	0.00	.01
103154 Chrysene	0.00	.01	103155 Dibenz(a,h)pyrene	0.00	.01
103156 Dibenz(a,i)pyrene	0.00	.01	103157 Dibenz(a,l)pyrene	0.00	.01
103158 Dibenz(ah)anthracene	0.00	.01	103159 Fluoranthene	0.00	.01
103160 Fluorene	0.00	.01	103161 Indeno(1,2,3-cd)pyrene	0.00	.01
103162 Naphthalene	0.00	.01	107132 Perylene	0.00	.01
103163 Phenanthrene	0.00	.01	103164 Pyrene	0.00	.01
103761 Retene	0.00	.01			

## ARC Remarks:

Zero (0) values indicate that the analyte is not DETECTED.

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H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

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\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybcuk	Team Leader	mail to: MWS Buffalo Pound Water Treatment Plant
	Organic Environmental Monitoring	attn: Dan Conrad
	Alberta Innovates - Technology Futures	
Date: 22-Mar-12	Bag 4000, Vegreville, Alberta	Box 1790
Contact No. (780) 632-8455	T9C 1T4	Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

page 1 of 1

Contact: MWS Buffalo Pound Water Treatment Plant  
 SmpNo : ProjNo : GrpSmpNo :  
 StNo : SK05JG0017 StaType:  
 Comment: Clearwell  
 Matrix : 9  
 SmpDate: 6-Mar-12 @ 0839 Samplers..ID1 :  
 EndDate: @ ..ID2 :

## GLYPHOSATE, AMPA AND GLUFOSINATE

METHOD: EC/16	TimeLines (days)
SCAN: GLYPH	from sample date
	Max Actual
Date Received : 7-Mar-12 by: JMP	- 1 --
Date Extracted: 12-Apr-12 by: KLS	10 37 *
Date Analyzed : 13-Apr-12 by: KLS	60 38 ok
Raw DataFile : g0656	

VMV_CODE	COMPOUND NAME	ug/L	flag	MOL	+/-	VMV_CODE	COMPOUND NAME	ug/L	flag	MOL	+/-
103453	Aminomethyl Phosphonic Acid	0.000		1.000		103626	Glufosinate	0.000		1.000	
103452	Glyphosate	0.000		.200							

Zero (0) values indicate that the analyte is not DETECTED.

MOL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.

X - Estimated value. The target compound meets the identification criteria, but is less than the MOL.

H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.

M - This value is calculated by an alternate Raw DataFile.

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\*\* - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Ryan Rybchuk Team Leader mail to: MWS Buffalo Pound Water Treatment Plant  
 Organic Environmental Monitoring attn: Dan Conrad  
 Alberta Innovates - Technology Futures  
 Date: 16-Apr-12 Bag 4000, Vegreville, Alberta Box 1790  
 Contact No. (780) 632-8455 T9C 1T4 Regina, Sk S4P 3C8

\*results relate only to the item tested\*

Please check the mailing information and inform the lab if changes are required.

Page 1 of 1

May 31, 2012

## ***SRC ANALYTICAL***

422 Downey Road  
Saskatoon, Saskatchewan, Canada  
S7N 4N1  
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
2476 Victoria Avenue  
Box 1790  
Regina, SK S4P 3C8  
Attn: Dan Conrad

Date Samples Received: May-24-2012

Client P.O.: 17003

---

This is a final report.

Organics results have been authorized by Pat Moser, Supervisor

ICP results have been authorized by Keith Gipman, Supervisor

Inorganics and Radiochemistry results have been authorized by Jeff Zimmer, Supervisor

SLOWPOKE-2 results have been authorized by Dave Chorney

---

\* Test methods and data are validated by the laboratory's Quality Assurance Program.

\* Routine methods follow recognized procedures from sources such as

- \* Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
- \* Environment Canada
- \* US EPA
- \* CANMET

\* The results reported relate only to the test samples as provided by the client.

\* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

\* Additional information is available upon request.

May 31, 2012

***SRC ANALYTICAL***

422 Downey Road  
 Saskatoon, Saskatchewan, Canada  
 S7N 4N1  
 (306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
 2476 Victoria Avenue  
 Box 1790  
 Regina, SK S4P 3C8  
 Attn: Dan Conrad

Sample #:	<b>2012018038</b>	Client PO #:	<b>17003</b>
Date Sampled:	<b>May 23, 2012</b>	Date Received:	<b>May 24, 2012</b>
Sample Matrix:	<b>WATER</b>		
Description:	<b>SK05JG0017 05/23/2012 07:54 BUFFALO POUND WATER - CLEARWELL</b>		

Analyte	Units	Result	DL
---------	-------	--------	----

**Inorganic Chemistry**

Total Cyanide (S.A.D.)	ug/L	<1	1
------------------------	------	----	---

**ICP**

Aluminum	mg/L	0.020	0.0005
Arsenic	ug/L	0.4	0.1
Barium	mg/L	0.072	0.0005
Boron	mg/L	0.06	0.01
Cadmium	mg/L	<0.00001	0.00001
Chromium	mg/L	<0.0005	0.0005
Copper	mg/L	<0.0002	0.0002
Iron	mg/L	<0.0005	0.0005
Lead	mg/L	<0.0001	0.0001
Manganese	mg/L	<0.0005	0.0005
Mercury	ug/L	<0.01	0.01
Selenium	mg/L	0.0004	0.0001
Uranium	ug/L	0.6	0.1
Zinc	mg/L	<0.0005	0.0005

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

May 31, 2012

## ***SRC ANALYTICAL***

422 Downey Road  
Saskatoon, Saskatchewan, Canada  
S7N 4N1  
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
2476 Victoria Avenue  
Box 1790  
Regina, SK S4P 3C8  
Attn: Dan Conrad

Date Samples Received: May-24-2012

Client P.O.: 17003

---

This is a final report.

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ICP results have been authorized by Keith Gipman, Supervisor

Inorganics and Radiochemistry results have been authorized by Jeff Zimmer, Supervisor

**SLOWPOKE-2 results have been authorized by Dave Chorney**

---

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\* Additional information is available upon request.

May 31, 2012

***SRC ANALYTICAL***

422 Downey Road  
 Saskatoon, Saskatchewan, Canada  
 S7N 4N1  
 (306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
 2476 Victoria Avenue  
 Box 1790  
 Regina, SK S4P 3C8  
 Attn: Dan Conrad

Sample #: **2012018043**  
 Date Sampled: **May 23, 2012**  
 Sample Matrix: **WATER**  
 Description: **05/23/2012 07:24 RAW WATER**

Client PO #: **17003**  
 Date Received: **May 24, 2012**

Analyte	Units	Result	DL
Total Cyanide (S.A.D.)	ug/L	<1	1

**Inorganic Chemistry**

Total Cyanide (S.A.D.)	ug/L	<1	1
<b>ICP</b>			
Aluminum	mg/L	0.097	0.0005
Arsenic	ug/L	1.5	0.1
Barium	mg/L	0.079	0.0005
Boron	mg/L	0.07	0.01
Cadmium	mg/L	0.00001	0.00001
Chromium	mg/L	<0.0005	0.0005
Copper	mg/L	0.0011	0.0002
Iron	mg/L	0.061	0.0005
Lead	mg/L	0.0001	0.0001
Manganese	mg/L	0.052	0.0005
Mercury	ug/L	<0.01	0.01
Selenium	mg/L	0.0004	0.0001
Uranium	ug/L	1.6	0.1
Zinc	mg/L	0.039	0.0005

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

May 31, 2012

***SRC ANALYTICAL***

Buffalo Pound Water Admin. Board

Sample #: **2012018044**  
Date Sampled: **May 23, 2012**  
Sample Matrix: **WATER**  
Description: **05/23/2012 11:15 SV010**

Client PO #: **17003**  
Date Received: **May 24, 2012**

Analyte	Units	Result	DL
---------	-------	--------	----

**Inorganic Chemistry**

Chemical oxygen demand	mg/L	11	4
------------------------	------	----	---

Oct 26, 2012

## ***SRC ANALYTICAL***

422 Downey Road  
Saskatoon, Saskatchewan, Canada  
S7N 4N1  
(306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
2476 Victoria Avenue  
Box 1790  
Regina, SK S4P 3C8  
Attn: Dan Conrad

Date Samples Received: Oct-16-2012

Client P.O.: 17003

---

This is a final report.

Organics results have been authorized by Pat Moser, Supervisor

ICP results have been authorized by Keith Gipman, Supervisor

Inorganics and Radiochemistry results have been authorized by Jeff Zimmer, Supervisor

SLOWPOKE-2 results have been authorized by Dave Chorney

---

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- \* Environment Canada
- \* US EPA
- \* CANMET

\* The results reported relate only to the test samples as provided by the client.

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\* Additional information is available upon request.

***SRC ANALYTICAL***

Oct 26, 2012

422 Downey Road  
 Saskatoon, Saskatchewan, Canada  
 S7N 4N1  
 (306) 933-6932 or 1-800-240-8808

Buffalo Pound Water Admin. Board  
 2476 Victoria Avenue  
 Box 1790  
 Regina, SK S4P 3C8  
 Attn: Dan Conrad

Sample #:	<b>2012040416</b>	Client PO #:	<b>17003</b>
Date Sampled:	<b>Oct 15, 2012</b>	Date Received:	<b>Oct 16, 2012</b>
Sample Matrix:	<b>WATER</b>		
Description:	<b>SK05JG0017 10/15/2012 08:07 BPWTP CLEARWELL    CHLORINE = 1.28 MG/L, PH = 6.84</b>		

Analyte	Units	Result	DL
---------	-------	--------	----

**Inorganic Chemistry**

Total Cyanide (S.A.D.)	ug/L	<1	1
------------------------	------	----	---

**ICP**

Aluminum	mg/L	0.012	0.0005
Arsenic	ug/L	0.5	0.1
Barium	mg/L	0.058	0.0005
Boron	mg/L	0.09	0.01
Cadmium	mg/L	<0.00001	0.00001
Chromium	mg/L	<0.0005	0.0005
Copper	mg/L	<0.0002	0.0002
Iron	mg/L	<0.0005	0.0005
Lead	mg/L	<0.0001	0.0001
Manganese	mg/L	0.0005	0.0005
Mercury	ug/L	<0.01	0.01
Selenium	mg/L	0.0003	0.0001
Uranium	ug/L	<0.1	0.1
Zinc	mg/L	<0.0005	0.0005

**Organic Chemistry**

Monochloroacetic acid	ug/L	<5	5
Monobromoacetic acid	ug/L	<1	1
Dichloroacetic acid	ug/L	1	0.5
Trichloroacetic acid	ug/L	<1	1

Oct 26, 2012

**SRC ANALYTICAL**

Buffalo Pound Water Admin. Board

---

Sample #: **2012040416**  
Date Sampled: **Oct 15, 2012**  
Sample Matrix: **WATER**  
Description: **SK05JG0017 10/15/2012 08:07 BPWTP CLEARWELL  
CHLORINE = 1.28 MG/L, PH = 6.84**

Client PO #: **17003**  
Date Received: **Oct 16, 2012**

Analyte	Units	Result	DL
<b>Organic Chemistry</b>			
Dibromoacetic acid	ug/L	<0.5	0.5
Halo Acetic Acids 5, Total (calc.)	ug/L	<5	5
Bromochloroacetic acid	ug/L	<0.5	0.5

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.



## QUALITY ASSURANCE LABORATORY ANALYTICAL REPORT

Mail:  
2000, 10423 - 101 Street  
Edmonton, Alberta  
T5H 0E8

Location:  
Water Laboratory  
Rossdale Water  
Treatment Plant  
9469 Rossdale Road  
Edmonton, Alberta  
T5K 0A5

Tel: 780-412-7614  
Fax: 780-412-7717

Submission: 2012-07-18-015 Date Logged: 18-Jul-12, 15:38  
  
Results To: DAN CONRAD Tel: (306) 694-1377x3  
Address: BUFFALO POUND Fax: (306) 694-6050  
PO BOX 1790 Customer PO:  
REGINA, SK Project ID: BUFFALO POUND DBP  
S4P 3C8 Receiving Temp (Deg Cel): 19

Report Id: VRS CRCBS7 3-Aug-12, 13:26

Sample ID	Sample Date	Client ID	Location	Sample Point	Method	Analyte	Result	Unit	Entry Date	Entry By	MDL
BA60378	Sample Condition: COLD,SAMPLE INTACT, DOCUMENTED										
BA60378	17-Jul-12 07:20		BUFFALO POUND	BPWT - RAWWATER (Q7)	106151	Microcystin	<0.5	ug/L	19-Jul-12	MLAKUSTA	0.5
BA60379	Sample Condition: COLD,SAMPLE INTACT, DOCUMENTED			BPWT - CLEARWELL	106151	Microcystin	<0.5	ug/L	19-Jul-12	MLAKUSTA	0.5
BA60379	17-Jul-12 07:18		BUFFALO POUND								

Note:

Report Date: Aug 3/12

CERTIFIED BY:

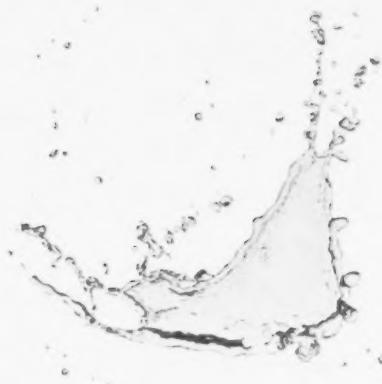
Rajendra Kothavade (Microbiologist)

The results relate only to the samples tested. This report should not be reproduced except in full, without written approval of the laboratory.

Page 1 of 1

BUFFALO POUND WATER ADMINISTRATION BOARD

## APPENDIX 2



### Financial Statements - 2012

BUFFALO POUND WATER ADMINISTRATION BOARD  
DECEMBER 31, 2012





Deloitte LLP  
2103 - 11th Avenue  
Mezzanine Level  
Bank of Montreal Building  
Regina, SK S4P 3Z8  
Canada

Tel: 306-565-5200  
Fax: 306-757-4753  
[www.deloitte.ca](http://www.deloitte.ca)

#### INDEPENDENT AUDITOR'S REPORT

To the Chairman and Members of the Buffalo Pound Water Administration Board

We have audited the accompanying financial statements of the Buffalo Pound Water Administration Board, which comprise the statement of financial position at December 31, 2012, and the statements of operations, reserve for replacement of capital assets, change in net financial assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

##### *Management's Responsibility for the Financial Statements*

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian public sector accounting standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

##### *Auditor's Responsibility*

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

##### *Opinion*

In our opinion, the financial statements present fairly, in all material respects, the financial position of the Buffalo Pound Water Administration Board as at December 31, 2012, and the results of its operations, change in its net financial assets and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

*Deloitte LLP*

Chartered Accountants

March 27, 2013  
Regina, Saskatchewan

Member of Deloitte Touche Tohmatsu Limited

BUFFALO POUND WATER ADMINISTRATION BOARD

Buffalo Pound Water Administration Board  
**STATEMENT OF FINANCIAL POSITION**  
*[in dollars]*

As at December 31

	2012	2011
<b>FINANCIAL ASSETS</b>		
Cash	2,899,524	1,765,730
Accounts receivable		
City of Regina	735,675	588,305
City of Moose Jaw	223,424	361,170
Other	241,920	407,142
Deficit receivable (Note 1)		
City of Regina	115,461	-
City of Moose Jaw	21,910	-
<b>Total financial assets</b>	<b>4,237,914</b>	<b>3,122,347</b>
<b>FINANCIAL LIABILITIES</b>		
Accounts payable and accrued liabilities	885,915	292,257
20% Refundable rate (Note 2)		
City of Regina	1,110,771	1,045,854
City of Moose Jaw	393,320	370,716
Surplus refundable (Note 1)		
City of Regina	-	93,483
City of Moose Jaw	-	20,925
Employee benefit obligations (Note 5)	459,349	441,160
<b>Total financial liabilities</b>	<b>2,849,355</b>	<b>2,264,395</b>
<b>Net financial assets</b>	<b>1,388,559</b>	<b>857,952</b>
<b>NON-FINANCIAL ASSETS</b>		
Inventory of chemicals	57,146	112,048
Prepaid expenses	12,632	1,500
Tangible capital assets (Note 6)	24,521,136	25,666,832
<b>Accumulated surplus (Note 8)</b>	<b>25,979,473</b>	<b>26,638,332</b>

See accompanying notes.

SIGNED ON BEHALF OF THE BOARD



\_\_\_\_\_  
 Board Member



\_\_\_\_\_  
 Board Member

**BUFFALO POUND WATER ADMINISTRATION BOARD**

**Buffalo Pound Water Administration Board**  
**STATEMENT OF OPERATIONS**  
*[In dollars]*

For the year ended December 31

	Budget (unaudited)	2012	2011
<b>REVENUES</b>			
General water rate charges			
City of Regina operating contributions	6,063,400	<b>6,320,880</b>	5,787,498
City of Moose Jaw operating contributions	1,320,955	<b>1,199,574</b>	1,295,017
City of Regina capital contributions	606,340	<b>632,088</b>	578,750
City of Moose Jaw capital contributions	132,096	<b>119,957</b>	129,502
	<b>8,122,791</b>	<b>8,272,499</b>	7,790,767
Refundable water rate	1,476,871	<b>1,504,091</b>	1,416,570
Power charges	266,500	<b>258,768</b>	246,597
Miscellaneous water sales	105,500	<b>115,177</b>	91,584
Interest	15,000	<b>29,149</b>	27,227
Other	2,400	<b>6,652</b>	4,760
	<b>9,989,062</b>	<b>10,186,336</b>	9,577,505
<b>EXPENSES (Schedule 2)</b>			
Employee wages and benefits	2,799,000	<b>2,678,619</b>	2,625,441
Amortization of tangible capital assets (Schedule 3)	1,764,694	<b>1,764,694</b>	1,790,471
Utilities	1,825,000	<b>1,729,461</b>	1,665,053
Chemicals	1,680,000	<b>2,219,605</b>	1,761,806
Refundable water rate	1,476,871	<b>1,504,091</b>	1,416,570
Vulnerabilities assessment		<b>30,000</b>	
Waterworks System Assessment		<b>-</b>	6,912
Equipment maintenance	931,000	<b>524,174</b>	422,494
Miscellaneous	221,000	<b>216,000</b>	223,748
Laboratory supplies and maintenance	168,000	<b>164,289</b>	140,188
Building and ground maintenance	97,500	<b>103,164</b>	116,565
Administration	57,000	<b>48,469</b>	48,125
	<b>11,020,065</b>	<b>10,982,566</b>	10,217,373
Deficiency of revenues over expenses before refundable surplus	(1,031,003)	<b>(796,230)</b>	(639,868)
Deficit owing (surplus refundable) from operations allocated as follows:			
City of Regina	<b>115,461</b>	(93,483)	
City of Moose Jaw	<b>21,910</b>	(20,925)	
<b>Change in accumulated surplus</b>	<b>(658,859)</b>	(754,276)	
Accumulated surplus, beginning of year	<b>26,638,332</b>	27,392,608	
<b>Accumulated surplus, end of year</b>	<b>25,979,473</b>	26,638,332	

See accompanying notes.

BUFFALO POUND WATER ADMINISTRATION BOARD

**Buffalo Pound Water Administration Board**  
**STATEMENT OF RESERVE FOR REPLACEMENT OF CAPITAL ASSETS**  
**[in dollars]**

For the year ended December 31

	2012	2011
<b>Balance, beginning of year</b>	<b>1,412,660</b>	910,142
Contributions		
City of Regina capital contributions	632,088	578,750
City of Moose Jaw capital contributions	119,957	129,502
Interest earned (Note 4)	22,288	8,528
Expenditures from reserve for replacement of capital assets (Schedule 1)	(269,307)	(214,262)
<b>Balance, end of year (Note 8)</b>	<b>1,917,686</b>	1,412,660

*See accompanying notes.*

BUFFALO POUND WATER ADMINISTRATION BOARD

**Buffalo Pound Water Administration Board**  
**STATEMENT OF CHANGE IN NET FINANCIAL ASSETS**  
*[in dollars]*

For the year ended December 31

	2012	2011
<u>Change in accumulated surplus</u>	<u>(658,859)</u>	<u>(754,276)</u>
Acquisition of tangible capital assets	(626,995)	(570,440)
Amortization of tangible capital assets	1,764,694	1,790,471
Loss on the disposal of tangible capital assets	497	-
Proceeds from Disposal	7,500	-
<u>Surplus of capital expenses over expenditures</u>	<u>1,145,696</u>	<u>1,220,031</u>
Acquisition of inventory of chemicals	(2,164,703)	(1,710,073)
Acquisition of prepaid expense	(12,632)	(1,500)
Consumption of inventory of chemicals	2,219,605	1,761,806
Use of prepaid expenses	1,500	4,838
<u>Surplus of expenses of other non-financial assets over expenditures</u>	<u>43,770</u>	<u>55,071</u>
<u>Increase in net financial assets</u>	<u>530,607</u>	<u>520,826</u>
<u>Net financial assets, beginning of year</u>	<u>857,952</u>	<u>337,126</u>
<b><u>Net financial assets, end of year</u></b>	<b><u>1,388,559</u></b>	<b><u>857,952</u></b>

*See accompanying notes.*

BUFFALO POUND WATER ADMINISTRATION BOARD

**Buffalo Pound Water Administration Board  
STATEMENT OF CASH FLOWS  
[in dollars]**

For the year ended December 31

	2012	2011
<b>OPERATING ACTIVITIES</b>		
Change in accumulated surplus	(658,859)	(754,276)
<b>Add back non-cash items</b>		
Amortization of tangible capital assets	1,764,694	1,790,471
Loss on disposal of tangible capital assets	497	-
<b>Net change in non-cash working capital balances</b>		
in accounts receivable	155,598	(437,451)
in accounts payable and accrued liabilities	593,658	46,670
in 20% refundable rate	87,521	134,514
in surplus refundable	(251,779)	(402,374)
in employee benefits obligations	18,189	36,763
in inventory of chemicals and prepaid expenses	43,770	55,071
<b>Cash provided by operating activities</b>	<b>1,753,289</b>	<b>469,388</b>
<b>CAPITAL ACTIVITIES</b>		
Acquisition of tangible capital assets	(626,995)	(570,440)
Proceeds on disposal of tangible capital assets	7,500	-
<b>Increase in cash position</b>	<b>1,133,794</b>	<b>(101,052)</b>
<b>Cash, beginning of year</b>	<b>1,765,730</b>	<b>1,866,782</b>
<b>Cash, end of year</b>	<b>2,899,524</b>	<b>1,765,730</b>

See accompanying notes.

## BUFFALO POUND WATER ADMINISTRATION BOARD

### Buffalo Pound Water Administration Board NOTES TO THE FINANCIAL STATEMENTS *[in dollars]*

For the year ended December 31, 2012

#### 1. BASIS OF OPERATIONS

The Buffalo Pound Water Administration Board (the Board) was formed under a 1951 agreement, amended in 1991, between the cities of Moose Jaw and Regina for the purpose of operating the water treatment facility at Buffalo Pound Lake to provide a water supply to the two cities at cost (the Agreement). Any surplus (deficit) in a particular fiscal year is distributed to (charged to) the cities according to their respective usage.

#### 2. SIGNIFICANT ACCOUNTING POLICIES

The financial statements of the Board are the representation of management and have been prepared in accordance with Canadian public sector accounting standards, as recommended by the Canadian Institute of Chartered Accountants (CICA). Significant aspects of the accounting policies adopted by the Board are as follows:

##### **Use of estimates**

The preparation of financial statements in conformity with Canadian public sector accounting standards requires management to make estimates and use assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the year. Actual results could differ from those estimates.

##### **Employee benefit obligations**

Employee benefit obligations relating to severance or retirement benefits are recognized to the extent that they are vested and could be taken in cash by an employee on termination.

##### **Pension benefit obligations**

The Board is one of the sponsors of a multi-employer defined benefit pension plan. The Board follows defined contribution accounting under which pension expense is limited to the Board's contributions to the plan.

##### **Inventory of chemicals**

Inventory of chemicals are valued at the lower of net realizable value and average cost.

##### **Capital contributions**

The funding for capital assets is through one of two means, from the Reserve for Replacement of Capital Assets or through a separate funding agreement between the cities of Moose Jaw and Regina (the cities).

Article 3 of the Agreement between the cities requires an additional contribution from each city equal to 10% of the general water rate for every mega litre of water sold. This contribution funds the Reserve for Replacement of Capital Assets from which capital assets may be funded. For major capital projects that the reserve is unable to fund, a separate agreement between the two cities may be struck in order to provide funding for the project. Contributions from the cities under Article 3 of the Agreement or through a separate agreement are shown as capital contributions for financial statement purposes.

BUFFALO POUND WATER ADMINISTRATION BOARD

Buffalo Pound Water Administration Board  
NOTES TO THE FINANCIAL STATEMENTS  
*[in dollars]*

For the year ended December 31, 2012

**2. SIGNIFICANT ACCOUNTING POLICIES (Continued)**

**Operating contributions**

Under the terms of the Agreement, each city pays the Board for water and electricity used based upon the following rates established by the Board:

	2012	2011
General water rate, per mega litre	<b>216.55</b>	210.59
Electricity rate, per kilowatt hour	<b>0.07908</b>	0.07714

These revenues are recognized as the water is delivered to the cities' water distribution systems. Other revenues are recognized when earned and measurable.

**Refundable water rate**

Under Article 5 of the Agreement, the Board receives an additional 20% of the general water rate from the cities for every mega litre of water sold. At each fiscal year end, the proceeds of these payments are refunded in proportion to the cities' respective capital investment in the Board.

**Financial instruments**

The fair value of cash, accounts receivable, accounts payable and accrued liabilities, the 20% refundable rate and the surplus refundable/ deficit owing approximates the carrying value given their short term nature.

**Tangible capital assets**

Tangible capital assets are recorded at cost which includes all amounts that are directly attributable to acquisition, construction, development or betterment of the asset. The cost, less residual value, of the tangible capital assets are amortized on a straight-line basis over their estimated useful lives as follows:

General	
Land improvements	20 years
Vehicles and equipment	6 to 20 years
Office and information technology	10 to 15 years
Infrastructure	
Plants and facilities	5 to 40 years
Roads	25 years

Assets under construction are not amortized until the asset is available for productive use.

Tangible capital assets received as contributions are recorded at their fair value at the date of receipt and also are recorded as revenue.

Leases are classified as capital or operating leases. Leases which transfer substantially all of the benefits and risks incidental to ownership of property are accounted for as capital leases and recorded as tangible capital assets. All other leases are accounted for as operating leases and the related lease payments are charged to expenses as incurred.

## BUFFALO POUND WATER ADMINISTRATION BOARD

### Buffalo Pound Water Administration Board NOTES TO THE FINANCIAL STATEMENTS *[in dollars]*

For the year ended December 31, 2012

#### 3. NEW STANDARDS NOT YET ADOPTED

A number of new standards and amendments to standards, are not yet effective for the year ended December 31, 2012, and have not been applied in preparing these financial statements. In particular, the following new and amended standards which become effective for annual periods on or after April 1, 2012 are:

- PS 3450, Financial Instruments
- PS 1201, Financial Statement Presentation
- PS 3410, Government Transfers
- PS 3260, Liability for Contaminated Sites

The extent of the impact on adoption of these standards is not known at this time.

#### 4. RESERVE FOR REPLACEMENT OF CAPITAL ASSETS

The Statement of Reserve for Replacement of Capital Assets shows allocated interest to the Reserve of 22,288 (8,528 in 2011). This represents the interest earnings for the year and is transferred in accordance with Article 3 of the Agreement. The interest is calculated by applying the prescribed rate, being bank prime less 1.2%, to the average monthly reserve balance to a maximum of the actual interest earned on the funds.

#### 5. EMPLOYEE BENEFIT OBLIGATIONS

The unfunded employee benefit obligations accrued at year end are as follows:

	2012	2011
Vacation pay	164,212	163,232
Vested termination payments	295,137	277,928
	459,349	441,160

Based upon an agreement with the Communications, Energy and Paperworkers' Union, termination payments for union employees vest after 15 years of service or upon retiring at the age of 65 after 10 years of continuous service. The amount payable on termination after vesting is 20 hours pay for each completed year of service.

For out-of-scope employees the termination payments vest after 10 years of service. The amount payable on termination after vesting is the wages the employee would have been paid had the employee worked for a time equal to their unused sick days on termination date. The maximum termination payment to an out-of-scope employee is 78 days pay.

Buffalo Pound Water Administration Board is a member of the City of Regina Civic Employees' Superannuation and Benefit Plan (the Plan), which is overseen by its own Administrative Board. All eligible permanent and probation employees of the Board are members of the Plan. This multi-employer Plan provides defined retirement benefits and is integrated with the Canada Pension Plan (CPP). The Plan provides a lifetime monthly pension based on an employee's years of service and the average of the best three consecutive years of earnings. For 2012 employees contributed 9.42% (2011 - 9.42%) of their earnings below the CPP maximum and 13.96% (2011 - 13.96%) of earnings above the CPP maximum and the Board matches employee contributions.

Preliminary financial statement projections as at December 31, 2012 indicate the Plan had a deficit (unfunded liability) of net assets available to pay accrued pension benefits of 251,510,000 (2011 - 292,818,000).

The Plan is a multi-employer defined benefit plan; therefore neither benefits nor contributions are segregated by employer. The percentage of active Plan members employed by the Board at year end was 0.7%. The Plan managers have been unable to determine the portion of any unfunded liability attributable to each employer. Accordingly, no portion of the deficiency has been recognized as a liability or expense in the financial statements.

BUFFALO POUND WATER ADMINISTRATION BOARD

**Buffalo Pound Water Administration Board  
NOTES TO THE FINANCIAL STATEMENTS  
[in dollars]**

For the year ended December 31, 2012

**5. EMPLOYEE BENEFIT OBLIGATIONS (Continued)**

The Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the amount of pension expense is equal to the contributions required for the year. Pension costs of 236,497(232,372 in 2011) based on employer contributions were expensed during 2012.

Buffalo Pound Water Administration Board is a member of the Regina Civic Employees' Long-term Disability Plan (the Disability Plan). Preliminary financial statement projections as of December 31, 2012 indicate a surplus of net assets available for benefits of 14,054,000 (2011 - 12,204,000).

The Disability Plan is a multi-employer plan and consequently, identification of individual employer's assets is not available from the Disability Plan managers. Accordingly, no portion of the surplus has been recognized as an asset or expense reduction in the financial statements. Disability benefits are based on 65% of the member's salary and will be paid either throughout the duration of the disability, until the member elects voluntary early retirement, reaches age 65 or upon death, whichever occurs first. The Disability Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the amount of benefit expense is equal to the contributions required for the year. Member contributions are made to the Plan at a rate of 0.92%, with the employer matching contributions. The Board recorded disability premium costs for 2012 of 18,717 (18,601 in 2011).

Dental and medical plans are also provided for most employees and are paid for by the Board.

**6. TANGIBLE CAPITAL ASSETS**

	NET BOOK VALUE	
	2012	2011
General		
Land improvements		
Vehicles and equipment	354,728	346,076
Office and information technology	20,180	15,778
Infrastructure		
Plants and facilities	24,005,761	25,188,359
Roads		
Assets under construction	140,467	116,619
	24,521,136	25,666,832

For additional information, see the Schedule of Tangible Capital Assets (Schedule 3). During the year there were no write-downs of assets (2011- \$nil). In addition, there were no assets contributed to the Board (2011- \$nil).

## BUFFALO POUND WATER ADMINISTRATION BOARD

**Buffalo Pound Water Administration Board**  
**NOTES TO THE FINANCIAL STATEMENTS**  
*[in dollars]*

For the year ended December 31, 2012

### 7. CAPITAL INVESTMENT

The Capital Investment represents the contributions made by each of the cities under Article 3 of the Agreement, as well as those made under separate agreement, which have been used for capital purposes. Each City's investment is proportionate to the amount contributed. For additional information, see Capital Investment (Schedule 1).

	2012			2011
	Regina	Moose Jaw	Total	Total
Balance - beginning of year	<b>56,066,817</b>	21,071,366	<b>77,138,183</b>	76,923,921
Additions funded by:				
Reserve for replacement of capital assets	198,883	70,424	<b>269,307</b>	214,262
Balance - end of year	<b>56,265,700</b>	21,141,790	<b>77,407,490</b>	77,138,183

### 8. ACCUMULATED SURPLUS

Accumulated surplus represents the equity of an organization. In determining accumulated surplus, revenues and expenses are recognized as they are earned and incurred, according to Canadian public sector accounting standards as recommended by the CICA.

	2012	2011
Investment in tangible capital assets	<b>24,521,136</b>	25,666,832
Reserve for replacement of capital assets	<b>1,917,686</b>	1,412,660
Employee benefit obligations (Note 5)	<b>(459,349)</b>	(441,160)
Accumulated surplus	<b>25,979,473</b>	26,638,332

BUFFALO POUND WATER ADMINISTRATION BOARD

**Buffalo Pound Water Administration Board  
CAPITAL INVESTMENT  
[in dollars]**

Schedule 1

For the year ended December 31

	2012	2011
<b>Balance - beginning of year</b>	<b>77,138,183</b>	76,923,921
Additions financed by reserve for replacement of capital assets		
Re-coating of Archimedes Screw Pumps	149,000	-
Instrumentation drawings	23,848	41,472
Chlorine safety upgrades	-	112,906
Filter valve replacement	-	8,982
Lab equipment	47,539	-
Vulnerabilities assessment	30,000	-
Waterworks assessment	-	6,912
Truck	18,920	-
Lab Equipment maintenance	-	43,990
	269,307	214,262
<b>Balance - end of year</b>	<b>77,407,490</b>	77,138,183
<b>Distribution of capital investment</b>		
City of Regina	56,265,700	56,066,817
City of Moose Jaw	21,141,790	21,071,366
	77,407,490	77,138,183

BUFFALO POUND WATER ADMINISTRATION BOARD

**Buffalo Pound Water Administration Board**  
**SCHEDULE OF EXPENDITURES**  
*[in dollars]*

**Schedule 2**

For the year ended December 31

	Budget (unaudited)	2012	2011
<b>EMPLOYEE WAGES AND BENEFITS</b>			
Wages - permanent employees	2,211,000	<b>2,124,949</b>	2,038,916
Employee benefits - permanent employees	430,000	<b>401,493</b>	391,567
Overtime wages - permanent employees	110,000	<b>87,037</b>	81,563
WCB premiums	27,000	<b>20,644</b>	29,039
Premium pay - permanent employees	14,000	<b>14,501</b>	14,274
Car allowance	4,000	<b>6,202</b>	4,938
Clothing and boot allowance	3,000	<b>2,225</b>	3,626
Wages - casual employees	-	-	22,820
Employee benefits - vacation, sick and termination	-	<b>18,189</b>	36,763
Employee benefits - casual employees	-	<b>3,379</b>	1,795
Overtime pay - casual employees	-	-	140
	2,799,000	<b>2,678,619</b>	2,625,441
<b>UTILITIES</b>			
Electricity	1,365,000	<b>1,364,125</b>	1,236,959
Natural gas	460,000	<b>365,336</b>	428,094
	1,825,000	<b>1,729,461</b>	1,665,053
<b>CHEMICALS</b>			
Alum	1,210,000	<b>1,738,699</b>	1,353,004
Granular activated carbon	220,000	<b>200,586</b>	209,403
Chlorine	150,000	<b>184,746</b>	131,021
Powder activated carbon	100,000	<b>95,574</b>	68,378
	1,680,000	<b>2,219,605</b>	1,761,806
<b>EQUIPMENT MAINTENANCE</b>			
Filtration plant	288,000	<b>130,890</b>	117,858
Wastewater system	170,000	<b>164,392</b>	108,008
Regeneration plant	175,000	<b>108,310</b>	88,637
Pump station	73,000	<b>9,668</b>	36,174
Computer and communications	113,000	<b>67,261</b>	63,897
High power electrical	102,000	<b>30,996</b>	4,042
Pipeline	10,000	<b>12,657</b>	3,878
	931,000	<b>524,174</b>	422,494

BUFFALO POUND WATER ADMINISTRATION BOARD

Buffalo Pound Water Administration Board  
**SCHEDULE OF EXPENDITURES (CONTINUED)**  
*[in dollars]*

**Schedule 2**

For the year ended December 31

	Budget (unaudited)	2012	2011
<b>MISCELLANEOUS</b>			
Insurance	70,000	<b>57,474</b>	65,131
General supplies	25,000	<b>22,425</b>	37,426
Telephone	16,000	<b>14,416</b>	15,051
Professional and membership fees	24,000	<b>18,388</b>	22,005
Travel and conventions	23,000	<b>19,773</b>	15,173
Maintenance - vehicles	22,000	<b>39,106</b>	26,019
Stationary and office supplies	21,000	<b>24,987</b>	20,285
Affiliation Fees	-	-	6,215
Advertising	-	<b>844</b>	-
Education and training	15,000	<b>11,583</b>	11,043
Contracted services	5,000	<b>5,042</b>	5,400
Tangible capital asset (gain)/loss	-	<b>497</b>	-
Foreign exchange (gain)/loss	-	<b>1,465</b>	-
	221,000	<b>216,000</b>	223,748
<b>LABORATORY SUPPLIES AND MAINTENANCE</b>			
Laboratory supplies	65,000	<b>68,829</b>	62,704
Accreditation program and research	55,000	<b>46,704</b>	40,991
Laboratory equipment	40,000	<b>39,656</b>	32,680
Contract analytical	8,000	<b>9,100</b>	3,813
	168,000	<b>164,289</b>	140,188
<b>BUILDING AND GROUND MAINTENANCE</b>			
Filtration plant	70,000	<b>93,211</b>	100,243
Regeneration plant	12,500	<b>7,543</b>	11,349
Lake pump station	15,000	<b>2,410</b>	4,973
	97,500	<b>103,164</b>	116,565
<b>ADMINISTRATION</b>			
City of Regina administration	32,000	<b>29,100</b>	29,114
Travel and conventions-Board Members	13,000	<b>9,368</b>	7,121
Audit services	12,000	<b>10,001</b>	11,890
	57,000	<b>48,469</b>	48,125

BUFFALO POUND WATER ADMINISTRATION BOARD

**Buffalo Pound Water Administration Board**  
**SCHEDULE OF TANGIBLE CAPITAL ASSETS**  
*[in dollars]*

**Schedule 3**

For the year ended December 31

	General			Infrastructure			2012	2011
	Land Improvements	Vehicles and Equipment	Office and Information Technology	Plants and Facilities	Roads	Assets Under Construction		
<b>Cost</b>								
Beginning of year	11,373	946,850	18,579	76,988,047	2,321	116,619	<b>78,083,789</b>	77,513,349
Add:								
Additions during year	-	73,958	6,476	522,713	-	23,848	<b>626,995</b>	570,440
Transfers from assets under construction	-	-	-	-	-	-	-	25,234
Less:								
Disposals during year	-	37,320	-	-	-	-	<b>37,320</b>	25,234
End of year	11,373	983,488	25,055	77,510,760	2,321	140,467	<b>78,673,464</b>	78,083,789
<b>Accumulated amortization</b>								
Beginning of year	11,373	600,774	2,801	51,799,688	2,321	-	<b>52,416,957</b>	50,626,486
Add:								
Amortization	-	57,309	2,074	1,705,311	-	-	<b>1,764,694</b>	1,790,471
Less:								
Accumulated amortization on disposals	-	29,323	-	-	-	-	<b>29,323</b>	-
End of year	11,373	628,760	4,875	53,504,999	2,321	-	<b>54,152,328</b>	52,416,957
<b>Net Book Value</b>	-	<b>354,728</b>	<b>20,180</b>	<b>24,005,761</b>	-	<b>140,467</b>	<b>24,521,136</b>	25,666,832

